November 1992 Issue #16

Radio Fun

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"The beginner's guide to the exciting world of amateur radio."

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President Bush Greets NJ Hams

President George Bush took a few moments out of his busy schedule in August to greet New Jersey radio amateurs by way of a local 2 meter repeater. During a visit to the Garden State to introduce a new jobs training program, President Bush was greeted by a number of state and local elected officials. Among them was Jeffrey H. Katz WB2DCV, past mayor and current deputy mayor of Springfield in Union County. "We toured the facility [Lincoln Technical Institute in neighboring Union] along with the president and then chatted with him over coffee. There's something special about a guy who tells you not to call him 'Mr. President,' but 'George' instead," said Katz.

After his address, the president took off by helicopter for another stop in Connecticut. While Bush was away, Katz, his wife Sharon, and other officials headed for Newark International Airport and a VIP tour of Air Force One, the president's official plane.

Katz, a long-time member of Springfield's Office of Emergency Management (OEM), had with him a township-issued ICOM W2A handheld dual-band transceiver. "While we waited on the tarmac for the president to return from Connecticut, I had time to check in on our Springfield OEM machine (WA2BAT) on 147.505 and caught Deputy Coordinator Scott Seidel WA2WUX," Katz continued. "While I was working Scott, the thought just hit me—why not ask the president to say a few words to New Jersey hams?"

Read My Lips! President Bush talks to New Jersey hams via 2 meters.

No sooner thought than done!

While Katz kept Seidel informed of activity at the airport, Seidel set up crosslinks and a tape recorder. As word spread among local hams, more and more began to monitor 147.505 for some presidential words.

"It was an impressive sight," said the deputy mayor. "Five Marine helicopters came into view. Each discharged its load of either press or staff and the last chopper carried the president. As the staffers boarded Air Force One, the president came over to us to shake hands.

"While we exchanged a few parting words, I asked the president if he'd mind saying hello to New Jersey's amateur radio operators. He said, 'Sure.' So, while I handled the PTT operation and held the W2A up for him, the president said, 'Hey! How are all you guys doing out there? Nice to talk to you.'

"One of our friends got a great picture of the event, but the tape recorder didn't work," Katz added. "In any event, we'll still have our memories, the live transmission, and that photo. Considering how tightly scheduled the president is, it was awfully nice of him to indulge the request. We really appreciated it."

TNX to Scott Seidel WA2WUX for the story.

Instant Licenses for Aliens?

The FCC on August 6th issued a Notice of Proposed Rule Making in P.R. Docket 92-167 to provide a way in which foreign amateurs could secure 60-day operating permission while visiting the U.S. The plan would include amateurs from countries with which the United States has no reciprocal operating agreement and would have volunteer examiners handle the mechanics of the applications. The comment deadline for P.R. Docket 92-167 is October 26.

The FCC proposes to have VEs examine the foreign operator's amateur license and identification, and determine the applicant's home operating privileges, then administer a 20-question examination "on those aspects of our rules that are most applicable to the type of operation in which the visitor plans to engage while in the United States."

The FCC suggests that VEs could compile the 20-question examinations from existing question pools maintained by Volunteer Examiner Coordinators.

Upon passing the examination, the foreign applicant would receive a Certificate of Successful Completion of Examination, which would serve as proof of the foreign operator's conditional license authorizing operation in the United States, according to the FCC.

The volunteer examiners then would notify their coordinating VEC, who would add the pertinent information on the foreign applicant to a data base that is maintained and forwarded to the FCC on a regular basis. The foreign operator would be allowed one maximum 60-day operating period in the U.S. at any time within 365 days of the issuance of the CSCE. *TNX Westlink Report, #632, August 28, 1992.*

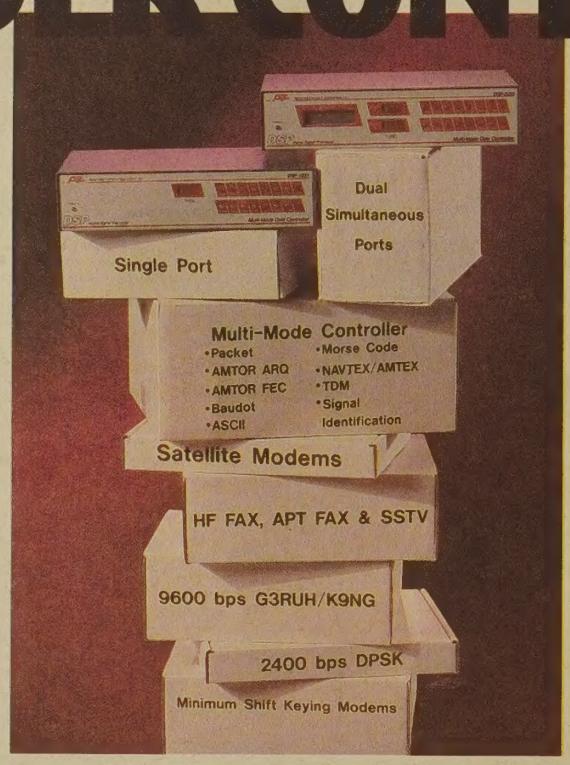
Field Day in Dinosaur Land.

The Western Colorado Amateur Radio Club, located in Grand Junction, Colorado, chose a site at the local fairgrounds near the city for the Field Day setup. Easy access from nearby Highway 50 brought numerous visitors attracted by the 100-foot boom topped with an antenna and an American flag. Good weather and the many contacts that were made contributed to making the 1992 Field Day a memorable experience.

(Photo by KCØHW; TNX to Ernest Scott NØOEQ for the info.)

WE'VE GOT EVERYTHING UNDER CONTROL

FREE "GET STARTED in PACKET" book with purchase of any AEA packet controller!
Good 10/1/92 – to – 2/28/93



In the world of multi-mode contollers, nothing tops the DSP-2232 or DSP-1232 from AEA. When you choose either the dual port DSP-2232 or single port DSP-1232, you'll have just what you need to couple HF or VHF/UHF (or both) transceivers with a personal computer or computer terminal. Each converts incoming analog signals into digital data by means of a 12-bit, high speed converter.

Developed by AEA — with over 10 years of multi-mode controller development experience — the DSP-2232/1232 are the most advanced and versatile controllers available anywhere. They give you the capability to control all legal Amateur digital modes popular on both HF and VHF. New modems only require new software which can be installed with an EPROM chip, or downloaded from a telephone BBS binary file into the DSP's RAM. You won't need to replace your DSP-2232 or DSP-1232 as no new hardware or modifications will be needed as new modes become available.

Whatever you've thought about doing in Amatuer radio, it's here in the DSP-2232 /1232. All PK-232 MBX modems (Packet, AMTOR, etc.). All satellite modems (PSK, 4800 bps PACSAT, G3RUH 9600 bps, U022 equalized, 400 bps OSCAR-13). Analog modems for HF FAX, FAX APT, and SSTV. 9600 bps K9NG/G3RUH for terrestrial and satellite use. Each also offers internal RAM for up-loading modems, up to 36 simultaneous packet connections, EPROM up to 2 Mbits, software selectable radio ports, Mailbox accessible through both ports, dedicated printer port, RTTY digital noise gate, ARQ tolerance command, etc.

The DSP-2232 adds even more control with its dual port gateway, front panel LCD showing connect and packets status, retrieval, call sign connected to, last call monitored and "marquee" display of received RTTY signals.

Get control of your digital operating position with the DSP-2232 or DSP-1232 from AEA. You'll be on top of the Amatuer radio world, too.

To connect with the AEA dealer nearest you or for product sheets, call (800) 432-8873.

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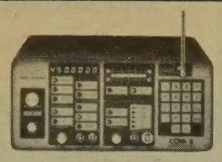
RAMSEY ELECTRONICS



COM-3
$299.95

2 WAY RADIO SERVICE MONITOR

COM-3, the world's most popular low-cost service monitor. For shops big or small, the COM-3 delivers advanced capabilities for a fantatic price—and our new lease program allows you to own a COM-3 for less than $3.00 a day. Features •Direct entry keyboard with programmable memory •Audio & transmitter frequency counter •LED bar graph frequency/error deviation display •0.1–10.000 µV output levels •High receive sensitivity, less than 5 µV •100 kHz to 999.9995 MHz •Continuous frequency coverage •Transmit protection, up to 100 watts •CTS tone encoder, 1 kHz and external modulation.

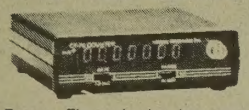
RSG-10
$249.95

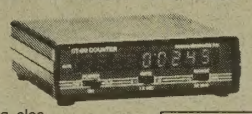
SYNTHESIZED SIGNAL GENERATOR

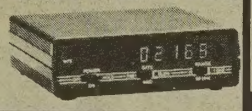
Finally, a low-cost lab quality signal generator—a true alternative to the $7,000 generators. The RSG-10 is a hard working, but easy to use generator ideal for the lab as well as for production test. Lease it for less than $3.00 a day. Features •100 kHz to 999 MHz •100 Hz resolution to 500 MHz, 200 Hz above • –130 to +10 dBm output range •0.1 dB output resolution •AM and FM modulation •20 programmable memories •Output selection in volts, dB, dBm with instant conversion between units •RF output reverse power protected •LED display of all parameters—no analog guesswork!

FREQUENCY COUNTERS

CT-70 7 DIGIT 525 MHz | **CT-90 9 DIGIT 600 MHz** | **CT-125 9 DIGIT 1.2 GHz**







Ramsey Electronics has been manufacturing electronic test gear for over 10 years and is recognized for its lab quality products at breakthrough prices. All of our counters carry a full one-year warranty on parts and labor. We take great pride in being the largest manufacturer of low-cost counters in the entire U.S.A. Compare specifications. Our counters are full-featured, from audio to UHF, with FET high impedance input, proper wave shaping circuitry, and durable high quality epoxy glass plated-thru PC board construction. All units are 100% manufactured in the U.S.A. All counters feature 1.0 ppm accuracy.

NEW CT-250 2.5 GHZ

ACCESSORIES FOR COUNTERS

Telescopic ship antenna—BNC plug, WA-10	$11.95
High impedance probe, light loading, HP-1	$16.95
Low-pass probe, audio use, LP-1	$16.95
Direct probe, general purpose use, DC-1	$16.95
Tilt bail, elevates counter for easy viewing, TB-70	$ 9.95
Rechargeable internal battery pack, BP-4	$ 8.95
CT-90 oven timebase, 0.1 ppm accuracy, OV-1	59.95

ALL COUNTERS ARE FULLY WIRED & TESTED

MODEL	FREQ. RANGE	SENSITIVITY	DIGITS	RESOLUTION	PRICE
CT-50	20 Hz–600 MHz	<25 mV to 500 MHz	8	1 Hz, 10 Hz	$189.95
CT-70	20 Hz–550 MHz	<50 mV to 150 MHz	7	1 Hz, 10 Hz, 100 Hz	$139.95
CT-90	10 Hz–600 MHz	<10 mV to 150 MHz <150 mV to 600 MHz	9	0.1 Hz, 10 Hz, 100 Hz	$169.95
CT-125	10 Hz–1.25 GHz	<25mV to 50 MHz <15 mV to 500 MHz <100 mV to 1 GHz	9	0.1 Hz, 1 Hz, 10 Hz	$189.95
CT-250	10 Hz–2.5 GHz typically 3.0 GHz	<25 mV to 50 MHz <10 mV to 1 GHz <50 mV to 2.5 GHz	9	0.1 Hz, 1 Hz, 10 Hz	$249.95
PS10B Prescaler	10 MHz–1.5 GHz, divide by 1000	<50 mV	Convert your existing counter to 1.5 GHz		$89.95

SPEED RADAR $89.95 complete kit SG-7

New low-cost microwave Doppler radar kit "clocks" cars, planes, boats, horses, bikes or any large moving object. Operates at 2.6 GHz with up to 1/4 mile range. LED digital readout displays speed in miles per hour, kilometers per hour or feet per second! Earphone output allows for listening to actual doppler shift. Uses two 1-lb coffee cans for antenna (not included) and runs on 12 VDC. Easy to build—all microwave circuitry is PC stripline. ABS plastic case with speedy graphics for a professional look. A very useful and full-of-fun kit.

BROADBAND PREAMP

Boost those weak signals to your scanner, TV, shortwave radio or frequency counter. Flat 25 dB gain, 1 to 1000 MHz. 3 dB NF. BNC connectors. Runs on 12 VDC or 110 VAC.
PR-2, wired, includes AC adapter $59.95

2M POWER AMP

Easy to build power amp has 8 times power gain, 1W in, 8W out, 2W in, 16W out, 5W is for 40W out. Same amp as featured in many ham magazine articles. Complete with all parts, less case and T-R relay.
PA-1, 40W pwr amp kit $34.95
TR-1, RF sensed T-R relay kit $11.95

FM WIRELESS MIKE KITS

FM-3 SHOWN

Pick the unit that's right for you. All units transmit stable signal in 88-108 MHz FM band up to 300' except for hi power FM-4 that goes up to 1/2 mile.
FM-1, basic unit $5.95
FM-2, as above but with added mike preamp $7.95
FM-4, long range, high power with very sensitive audio section, picks up voices 10' away $14.95
MC-1, miniature sensitive mike cartridge for FM-1,2,4 ..... $2.95

MICROWAVE INTRUSION ALARM

A real microwave Doppler sensor that will detect a human as far as 10 feet away. Operates on 1.3 GHz, and is not affected by heat, light, or vibrations. Drives up to 100 mA output, normally open or closed, runs on 12 VDC.
Complete kit MD-3 . $19.95

MUSIC MACHINE

Neat kit that will produce 25 different classical and popular tunes, plus 3 doorchime sounds. Lots of fun for doorbells, shop, or store entrances, car horn, music boxes, etc. Runs on 9V battery or wall transformer. Excellent speaker volume and adjustable tempo and pitch. Add our case set for a handsome finished look.
Complete kit, MM-5 ..... $24.95
Case + knob set, CMM-5 . $12.95

PACKET RADIO

Two new versions are available for the Commodore 64 (P-64A) or the IBM-PC (P-IBM). Easy assembly "NO TUNiNG". Includes FREE disk software, PC Board and Full Documentation.

KIT	P-64A	$59.95
	P-IBM	$59.95
CASE	CPK	$12.95

LO NOISE PREAMPS

Make that reciever come ALIVE! Small size for easy installation with Hi-Q tuned input for peak performance. Excellent gain and noise figure—guaranteed to improve reception! Specify band: 2M—PR-10, 220 MHz—PR-20, 440 MHz—PR-40.
Each kit $17.95

TONE DECODER

A complete tone decoder on a single PC board. Features: 400–5000 Hz adjustable range via 20-turn pot, voltage regulation, 567 IC. Useful for touch-tone burst detection, FSK, etc. Can also be used as a stable tone encoder. Runs on 5 to 12 volts.
Complete kit, TD-1 $6.95

VOICE ACTIVATED SWITCH

Voice activated switch kit provides switched output with current capability up to 100 mA. Can drive relays, lights, LED, or even a tape recorder motor. Runs on 9 VDC.
VS-1 kit $6.95

TELEPHONE TRANSMITTER

Mini-sized with professional performance. Self-powered from phone line, transmits in FM broadcast band up to ¼ mile. Installs easily anywhere on phone line or inside phone!
PB-1 kit $14.95

NEW SPEAKER PHONE

Talk on the phone hands-free, great to put in shop or shack, press the button to answer—no actual phone needed. Works same as commercial units. Talk from anywhere in room, phone line powered—no battery needed. Super for family and conference calls or buy two for hands-free intercom! Add our case set for a pro look.
SP-1 ..... $29.95 Case-CSP $12.95

TICKLE STIK

A shocking kit! Blinking LED attracts victims to pick up innocent-looking can—you watch the fun! Ideal for office desks, parties, nosey know-it-alls!
TS-4 kit $9.95

LIGHT BEAM COMMUNICATORS

Transmits audio over infrared beam up to 30'—use simple lenses to go up to ¼ mile! Hum free, uses 30 kHz carrier. Great for wireless earphones or undetectable "bug."
Transmitter + receiver set, LB56 . $19.95

FM RADIO

Full-fledged superhet, microvolt sensitivity, IC detector and 10.7 MHz IF. Tunes Std. FM broadcast band as well as large portions on each end. Ideal for "bug" receiver, hobby experiments or even as FM radio!
FR-1 kit $19.95

SUPER SLEUTH

A super sensitive amplifier which will pick up a pin drop at 15 feet! Great for monitoring baby's room or as general purpose amplifier. Full 2W rms output. Runs on 6 to 15 volts, uses 8–45 ohm speaker
BN-9 kit $6.95

BROADBAND PREAMP

Very popular sensitive all-purpose preamp, ideal for scanner, TVs, VHF/UHF rigs, counters. Lo noise, 20 dB gain, 100 kHz–1 GHz, 9V–12 VDC operation.
SA-7 kit $14.95

•2 METERS •223 MHz •440 MHz

$149.95

FANTASTIC FM TRANSCEIVERS

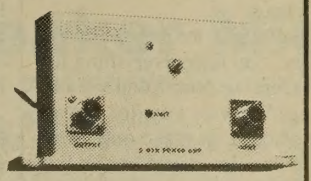
SYNTHESIZED—NO CRYSTALS

Ramsey breaks the price barrier on FM rigs! The FX is ideal for shack, portable or mobile. The wide frequency coverage and programmable repeater splits makes the FX the perfect rig for Amateur, CAP or MARS applications. Packeteers really appreciate the dedicated packet port, "TRUE-FM" signal and almost instant T/R switching. High speed packet? ....No problem. Twelve diode programmed channels, 5W RF output, sensitive dual conversion receiver and proven EASY assembly. Why pay more for a used foreign rig when you can have one AMERICAN MADE (by you) for less. Comes complete less case and speaker mike. Order our matching case and knob set for that pro look.

FX-146 kit (2 Meters)	$149.95
FX-223 kit (1¼ Meters)	$149.95
FX-440 kit (3/4 Meters)	$169.95
CFX matching case set	$ 24.95

2 MTR & 220 BOOSTER AMP

Here's a great booster for any 2 meter or 220 MHz hand-held unit. These power boosters deliver over 30 watts of output, allowing you to hit the repeater's full quieting while the low noise preamp remarkably improves reception. Ramsey Electronics has sold thousands of 2 meter amp kits, but now we offer completely wired and tested 2 meter, as well as 220 MHz, units. Both have all the features of the high-priced boosters at a fraction of the cost.
PA-10 2 MTR POWER BOOSTER (10 X power gain)
Fully wired & tested $89.95
PA-20 220 MHz POWER BOOSTER (8 X power gain)
Fully wired & tested $89.95



QRP TRANSMITTERS HAM RECEIVERS

20, 30, 40, 80M CW TRANSMITTERS

Join the fun on QRP! Thousands of these mini-rigs have been sold and tons of DX contacts have been made. Imagine working Eastern Europe with a $30 transmitter—that's ham radio at its best! These CW rigs are ideal mates to the receivers at right. They have two-position variable crystal control (one popular QRP XTAL included), one watt output and built-in antenna switch. Runs on 12VDC. Add our matching case and knob set for a handsome finished look.
Your choice of bands $29.95
(Specify band: QRP-20, 30, 40 or 80)
Matching case & knob set, CQRP $12.95

20, 30, 40, 80M All Mode RECEIVERS

Build your own mini ham station. Sensitive all-mode AM, CW, SSB receivers use direct conversion design with NE602 IC as featured in *QST* and ARRL handbooks. Very sensitive varactor tuned over entire band. Plenty of speaker volume. Runs on 9V battery. Very EASY to build, lots of fun and educational—ideal for beginner or old pro. New 30-page manual. Add the case set for well-fitted professional look.
Your choice of bands $29.95
(Specify band: HR-20, HR-30, HR-40, HR-80)
Matching case & knob set, CHR $12.95

E-Z KEY CMOS KEYER

Send perfect CW within an hour of receiving this kit! Easy-to-build kit has sidetone oscillator, speed control and keys most any transmitter. Runs for months on a 9V battery. 28-page manual gives ideas on making your own key for extra savings. Add our matching case set for complete station look.
CW-7 kit $24.95
Matching case knob set, CCW $12.95

ACTIVE ANTENNA

Cramped for space? Get longwire performance with this desktop antenna. Properly designed unit has dual HF and VHF circuitry and built-in whip antenna, as well as external jack. RF gain control and 9V operation makes unit ideal for SWLs, traveling hams or scanner buffs who need hotter reception. The matching case and knob set gives the unit a hundred dollar look!
AA-7 Kit $24.95
Maiching case & knob set, CAA $12.95

SPEECH SCRAMBLER

Communicate in total privacy over phone or radio. Kit features full duplex operation using frequency inversion. Both mike and speaker or line in/out connections. Easy hookup to any radio, and telephone use requires no direct connection! Easy to build 2 IC circuit. Can also be used to descramble many 2-way radio signals. Finish your kit off with the handsome case & knob set.
SS-7 kit $29.95
Matching case & knob set, CSS $12.95

SHORTWAVE RECEIVER

Fantastic receiver that captures the world with just a 12" antenna! Can receive any 2 MHz portion from 4–11 MHz. True superhet has smooth varactor tuning, AGC, RF gain control, plenty of speaker volume and runs on a 9V battery. Fascinating Scout, school or club project provides hours of fun for even the most serious DXer. For the car, consider our shortwave converter. Two switchable bands (in 3–22 MHz range), each 1 MHz wide—tunable on your car radio dial. Add some interest to your drive home!
Shortwave receiver kit, SRI $29.95
Shortwave converter kit, SCI $27.95
Matching case set for SRI, CSR $12.95
Matching case set for SCI,CSC $12.95

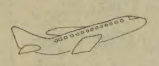
2, 6, 10 MTR, 220 FM RECEIVERS

Keep an ear on the local repeater gang, monitor the cops, check out the weather or just plain listen around. These sensitive superhet receivers are just the ticket. They tune any 5 MHz portion of the band and have smooth varactor tuning, dual conversion with ceramic IF filters, AFC, adjustable squelch and plenty of speaker volume. Runs on 9V battery and performance that rivals the big rigs! For a complete finished pro look, add our matching case and knob set with screened graphics.
FM communications receiver kit $29.95
Specify band: FR 146 (2m), FR6 (6m), FR10 (10m), FR-220 (220 MHz)
Matching case & knob set, CFR $12.95

FM STEREO TRANSMITTER

Run your own stereo FM station! Transmit a stable signal in the standard FM broadcast band throughout the house, dorm or neighborhood. Connects easily to line outputs on CD player, tape decks, etc. Runs on 9V battery, has internal whip antenna and external antenna jack. Add our case set for a "station" look!
FM-10 kit $29.95
Matching case set, CFM $12.95

AIRCRAFT RCVR



Hear exciting aircraft communications—pick up planes up to 100 miles away! Receives 110–136 MHz AM air band, smooth varactor tuning superhet with AGC, ceramic filter, adjustable squelch, excellent sensitivity and lots of speaker volume. Runs on 9V battery. Great for air shows or just hanging around the airport! New 30-page manual details pilot talk, too. Add case set for "pro" look.
AR-1 kit $24.95
Matching case set, CAR $12.95

TERMS: Satisfaction guaranteed. Examine for 10 days. If not pleased return in original form for refund. •Add $3.75 for shipping, handling and insurance. •For foreign orders add 20% for surface mail. •COD (U.S. only), add $5.00. • Orders under $20, add $3.00. •NY residents add 7% sales tax •90-day parts warranty on kit parts. •1-year parts & labor warranty on wired units.

VISA MasterCard

PHONE ORDERS CALL
716-924-4560
FAX 716-924-4555

RAMSEY ELECTRONICS, INC. 793 Canning Parkway, Victor, NY 14564

CIRCLE 34 ON READER SERVICE CARD

Make Your Own Circuit Boards

Try this easy method using TEC-200 film and a photocopier.

by Kevin B. Proctor NØOAS

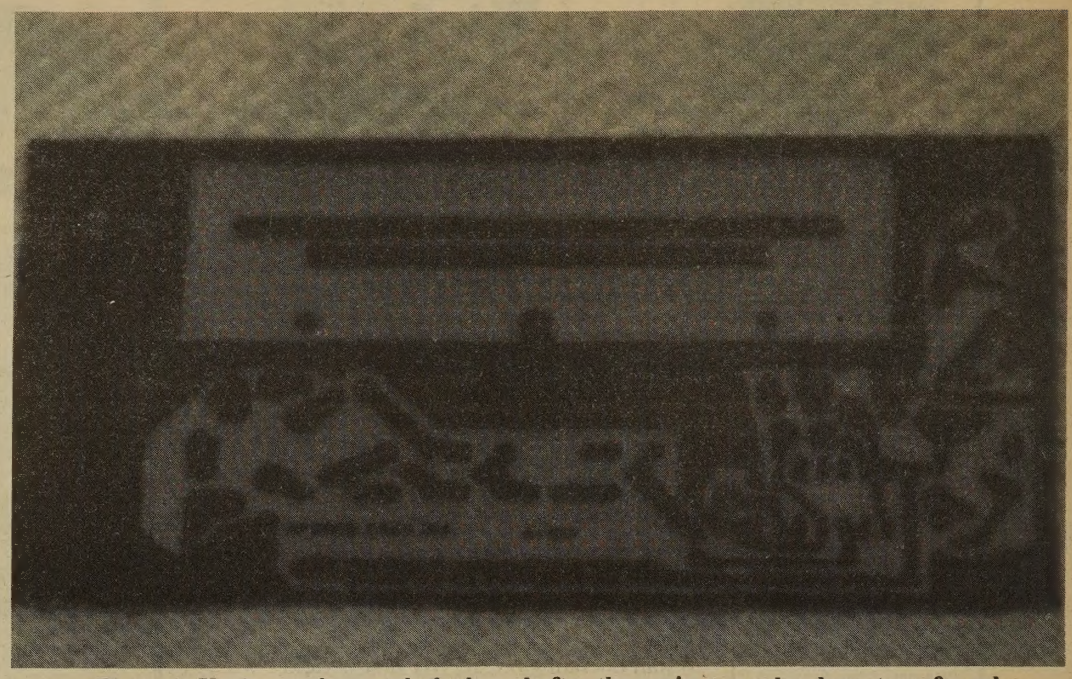


Photo A. You're ready to etch the board after the copier toner has been transferred from the TEC-200 film onto the blank PC board using a hot iron.

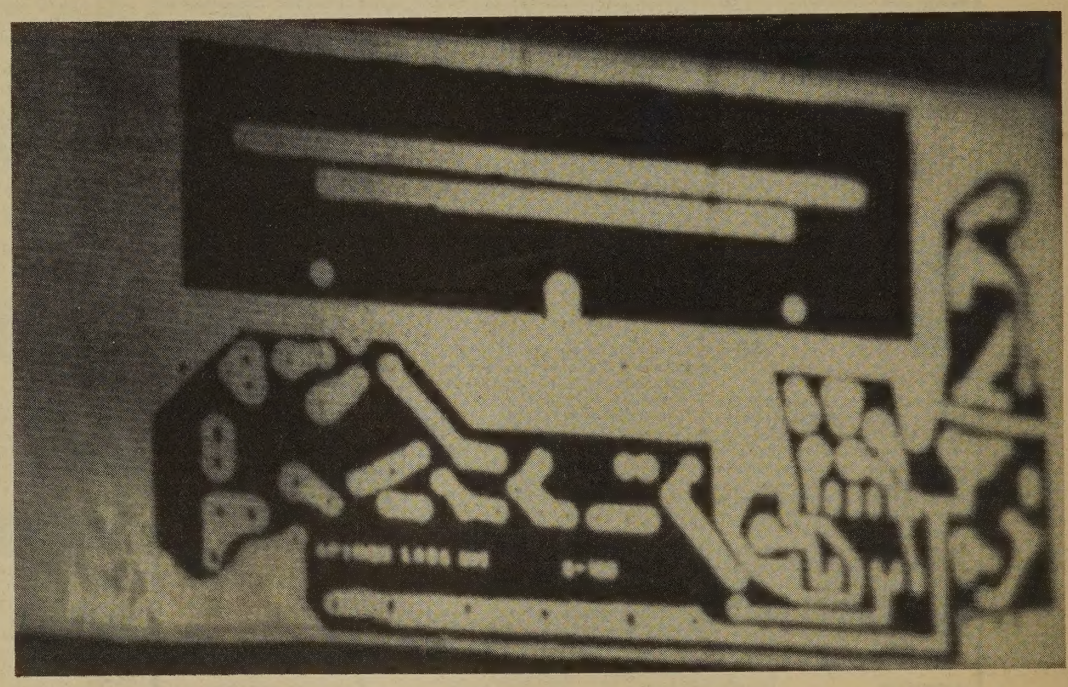


Photo B. The final etched PC board. The toner is easily removed with fingernail polish.

Wow! What a neat project! I think I'll build it! Sound familiar? I've got projects lined up for the next five years, at least.

So you gather up the parts and study the theory. You have everything together except the board, and want to get going. What do you do? Either order the board, or make one yourself. You could use perf board, but this is a UHF project, and half of the inductors are part of the board.

Making your own board is no longer as difficult as it once was. You don't have to worry about light-sensitizing the board, exposing the board, developing the board, then finally etching the board. You can use TEC-200 film and a photocopy machine instead!

Not another article about TEC-200! Well, the others that I have read tell you how it is supposed to work, not how it actually does work.

You need to assemble the following items before you run down to the local copy shop: a pair of scissors, a glue stick, a couple of extra sheets of paper, enough circuit board artwork to fill an 8-1/2" by 11" sheet of paper, and, of course, your TEC-200 film.

Making the Board

Start out by making copies of your artwork on regular copy paper. Cut the artwork out and paste the cutouts to one of your extra sheets of paper. I do this to utilize as much of a sheet of film as possible. This film is relatively expensive, about a buck a sheet, so I like to do several boards at a time.

Take a sheet of the TEC-200 film and single-sheet feed it through the copy machine to make a copy of your paste-up sheet. It doesn't matter which side of the film is up, but notice that the top side of all of your copies will be a little rough from the toner that the copier deposits on the film.

OK, this next step is very important. Place the sheet of film that you just copied your artwork to FACE UP on the copy machine, place a sheet of plain white paper on top of the film, and CLOSE THE LID! Copy this onto another sheet of film. If you placed everything right, the rough side of the second film copy should be all backwards. This is what you want. The copy should be nice and black with no smears. If it isn't black enough, adjust the darkness control on the copier and try again. The film can be cleaned with fingernail polish remover and re-used as long as you haven't cut it up. Although, if the copy machine will handle sheets that are smaller than 8-1/2" by 11", I suppose you could try half sheets. If things are smeared, try cutting back on the darkness control. Sometimes changing machines will help, too. Some copy machines try to make the film turn a lot of corners. This can be a problem as the film is pretty slick and will not pick up well in this type of machine. Again, if this seems to be a problem, try a different machine.

OK, now you have a nice black, backwards copy on your buck-a-sheet film, and one or more sheets of film to clean off.

Clean these up first, as you will eliminate a lot of confusion by having them out of the way, and the film will be ready to be re-used.

Now, cut your desired artwork out of the sheet and place the rest in a folder to keep the toner from getting knocked off. Make sure that the XYL will let you use her iron (that's right, as in clothes iron), and let it warm up to the linen setting. If she doesn't understand why you need her clothes iron for your next project, do what I do. Get sneaky, and use it anyway, or threaten to turn her microwave oven into a transmitter, whichever works best. (You should have seen my wife's face when she saw the coax running out from underneath and the desk mike from my old Swan 350 plugged into the temperature probe jack!)

Next, you will want to make sure that the copper-clad board you are going to use is very, very clean. Naturally, a good quality, smooth surfaced board is going to take the transfer better than a cheap rough one. A "Scotchbrite" brand pad, a little water, and a little elbow grease will do a nice job of getting right down to the copper. Follow this up with a wipe down of acetone or something similar to get all of your grubby little fingerprints off the surface. That board has to be CLEAN.

Place the piece of film that you cut out face down (rough side to the copper) and secure it with a piece of tape or two at the corners to hold everything nice and steady. Get your fingers out of the way so you don't get burned, and apply the hot iron to the film. The iron will have to stay on the film for a few minutes, but don't worry about melting the film. The film will hold up. The tape will not, however, so try to place it outside of your traces. The object is to melt the toner onto your copper-clad board without mashing the traces all out of shape. Once you think you have got the pattern transferred, keep the iron on it for another 15 to 20 seconds, then remove the iron.

DON'T TOUCH ANYTHING UNTIL THE WHOLE WORKS IS COMPLETELY COOL. If you try to pull things apart too soon, part of your pattern will stay with the film instead of sticking to the board. If you managed to melt the Scotch tape all over the bottom of your XYL's iron, you can clean it up by ironing a sheet of waxed paper while the iron is still hot, and following that up by ironing a piece of paper towel. Iron the waxed paper anyway. It will keep you out of trouble, and keep the XYL's iron from sticking the next time she tries to use it. I hope.

Once everything is cool to the touch, carefully peel the film off of the board. It will sound kind of like Velcro™ coming apart, but that is what it should sound like. If part of your pattern comes with it, simply iron it back down, putting a little extra pressure on the stubborn spot with the edge or tip of the iron.

Etching

OK, the pattern transferred and you are ready to etch.

Wrong. You are not ready to etch. First you need to go over the board and make sure that all of the traces and pads are BLACK. Touch things up with a fine point PERMANENT marker. Don't bother to spend the extra money for one of those fancy "etch resist" pens. About all they amount to is a fine point magic marker anyway and the ink doesn't flow as well. Check that traces and pads are separated where they are supposed to be separated and make sure that all of your artwork is very black. Do your best to keep your fingers off of the board, as the etch resist is fairly fragile and the oil from your skin will retard the etchant to some degree.

Place the board in the etchant, being sure that you are using a glass or plastic tray to do your etching in. Slosh things around for about 10 to 20 minutes, and you should have an etched board. Check to be sure that all of the unwanted copper is removed. If it isn't, put the board back in the etchant for a while longer. As soon as all of the unwanted copper is gone, remove and rinse the board in cool water. The etch resist material (toner) will come off with a little fingernail polish remover.

You are almost done! All that's left is to drill your holes and treat the board with a tinning agent to improve the solderability.

As you can see, it is not a difficult job. The main thing you need to do is get things CLEAN. That, and a little touch-up to insure that the etch resist is solid and this system will produce many hours of construction fun. RF

Radio Fun

NOVEMBER 1992
issue #16

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RADIO FUN (ISSN 1055-887X) is published monthly by Radio Fun, a division of Wayne Green, Inc., 70 Route 202-N, Peterborough NH 03458. Subscriptions: $14.00 per year. Canada add $8.00. Foreign add $12.00 surface/$32.00 airmail. Second class postage pending at Peterborough NH and additional mailing offices.

POSTMASTER: Send address corrections to RADIO FUN, P.O. Box 4926, Manchester NH 03108.

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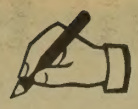

Write to: Radio Fun, 70 Route 202-N, Peterborough, NH 03458

Colin Clark VE3UED, Elmvale, Ontario, Canada I decided to write to you to tell you how great the hams in my area have been. I am a 13-year-old ham living in a small town, and I am relatively new to amateur radio. I first learned about ham radio when a local ham, VE3BQN, came to my school to do a radio demo. He let us talk on the air, and he showed an informative video on radio that got me hooked. He told me where I could take a licensing course, and that September I started. At first all the radio theory and the math to go along with it were very overwhelming, but with help from BQN and my instructor I managed to pass the exam with flying colors.

I received my 5 wpm code with my basic license. I was all ready to start operating on 2m. My first shaky QSO was with a very understanding ham who was very happy to see new hams on the air. I quickly made friends with all the local hams, and one old-timer was even nice enough to try to arrange for me to learn about packet radio at a local packet meeting.

When I moved to HF I was limited to 80m, but I was greeted warmly on the various nets there. I made numerous stateside contacts, and I ran into no problems with them. That gave me enough encouragement to pass my 12 wpm code and get onto 40, 20 and 10 meters.

I have done some DXing on 20m, and I have had no problems with the hams. Everyone has been very kind and helpful, even though I'm only 13!

Basically, I want to tell you that the hams in my area are great, and I haven't run into any of the problems of old geezers like some other new hams. So remember, there *is* a group of old-timers who are helpful rather than rude!

Lee Tucker KD4ESM I really enjoy your magazine. One thing I would like to see is some discussion of 6 meter QRP. Why does all the discussion stop with 10 meters, especially with all us No-Code Techs running around? What are the conversion parameters going from 10m to 6m?

Lee—Great idea! Any 6 meter enthusiasts out there?—David N1GPH

Chris Smith N9LCK, Aurora IL I'm a No-Coder and proud of it, and this is the only ham publication that made me feel welcome! Enclosed you will find my renewal for two more years. Keep up the great work.

Philip J. Kurman KD6IEV, Whittier CA I would like to applaud you for your support of No-Code Technicians. I think that the No-Code Techs have the ability to help amateur radio grow and bring much needed new blood into the hobby.

I am currently quite active in two systems. One is a closed UHF system and the other a sophisticated 1200 system. I have been greeted with full acceptance and have met many wonderful new friends, increased my knowledge and had a lot of fun.

However, immediately upon receiving my ticket I bought a 2 meter HT and I was amazed at how rude, unaccepting and biased some hams I met were. No one commented on my operating methods, only on how new my ticket was. A few hams asked how long I'd had my ticket and my second amateur contact QRT'd once he heard I'd had my ticket only a few hours and signed by saying, "Come back when you have a real ticket." That certainly doesn't reflect a "welcome aboard" attitude to the hobby.

One last item. I am a Probation Officer for the County of Los Angeles, working with "gangbangers." During the April riots the "company radio system" crashed for about 20 minutes and I found myself with nothing more than a 1200/450 HT and it was via that radio that I was able to have communication until our system went up again. I was attempting to request an LAPD backup via an autopatch and some fool broke in and asked how long I'd been licensed! (Simple minds . . .)

Thanks for a great publication and for your support of amateur radio and No-Code Techs.

Jason Feifer KD4DYV, Coral Springs FL I got into ham radio when I was 11 years old. Now I'm 12. I got into ham radio because of a number of things: because my camp had a ham class, because my dad's friend is a ham and, yes, because of CB! I got my dad into ham radio and he just got his license. My 12-year-old friend, a CBer, was once interested but now isn't . . . born a CBer, always a CBer.

I tried to start a club in my school but it didn't work out. I've joined many groups, like 10-10 and Brooklyn Bridge. I am working on Tech now, and will be taking the test real soon.

Jason—You sound like the kind of newcomer we need in this hobby. Congratulations and keep up the good work.—David N1GPH

Continued on page 21

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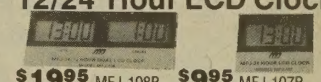

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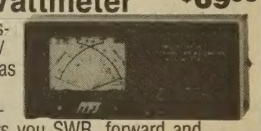
MFJ Cross-Needle SWR/Wattmeter MFJ-815B **$69.95**



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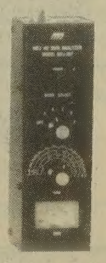

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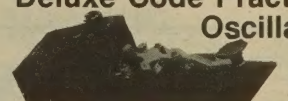

MFJ-557 **$24.95**

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base so it stays put on your table. Portable because it runs on a 9-volt battery (not included) or an AC adapter ($12.95) that plugs into a jack on the side.

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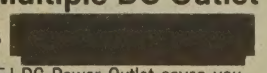

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License-Free Packet Radio

Add a telephone dial-up port to your PBBS.

by Steve Wolf NO8M

There has been quite a bit of interest in telecommunications networks. Kids play for hours in fantasy worlds or attempt to beat this system or that, trying to steal what information they can find. Books capture the public fascination with the mystique and adventure of a story about a computer network who-done-it. WHAT AN AUDIENCE FOR AMATEUR RADIO!

PBBS Access by Telephone

All it would take is a way to let them into our network, but keep them from getting out on the air. All the pieces are already here in our networks and the software exists to allow them access. What would happen if we opened a port of our club PBBS to anyone, licensed or not?

The answer came almost immediately. All those telecommunications folks ran slap-bang into our port. Some stayed and became interested. Others were already studying for their license and began calling and becoming a part of our networks.

And, all of a sudden, another part of our club surfaced in this port. People having modems at home or work started calling and utilizing the port. Before long, these licensed people were out buying TNCs to become fully packet-compatible.

Next, something else happened. We began receiving long-distance connects over the modem port from PBBS stations like Art KA3FMO in New Jersey and Bill WA2GYM in South Carolina. Massive quantities of new information would flow into the PBBS when this occurred as days of forwarding were bypassed by these long-distance forwarders.

The next surprise will be right around the corner. However, like various other club activities, what started out as a dubious adventure into something some thought silly has evolved into a full-time valuable club resource.

Give the following set-up description to your local packet BBS sysop or bring it to your radio club and see if they can set up a non-licensed user port. For a demonstration just dial up the modem port at the phone number given at the end of the article.

Setting Up the Software

Having the author of MSYS, Mike WA8BXN, as a friend and camping buddy sure does help when it comes to setting something like this up. The modem port grew out of an attempt to keep another form of control attached to the network. The idea was not for a general-use port; it was for allowing a Sysop to remotely control the PBBS.

However, with the hold function, the PBBS provides a method of allowing anyone to utilize the board. Here is how to set it up.

Set up a fictitious call. We use V1SIT. Now add the following two lines to the MSYSHOLD.DAT:

```
FROM=V1SIT
CONNECTED=V1SIT
```

This will cause any traffic from user V1SIT (or sent on the port while V1SIT is connected) to be held. Now, set up MSYSPASS.MOD, the modem password file, with the following lines:

```
VISIT VISIT V1SIT
Visit Visit V1SIT
visit visit V1SIT
V1SIT V1SIT V1SIT
```

This allows connects from anyone using the combinations included here to use the PBBS. It covers a majority of the case combinations that an unfamiliar user might try. They will use this for both the call (first column) and the password (second column) and cause MSYS to use V1SIT as the station's anonymous callsign.

An introductory text file, MSYSMOD.MSG, is the next file to build. See the sidebar for the one we use that utilizes about 23 of the output lines received when you first connect.

That is normally enough to allow a new user to begin actively using the PBBS.

Next, we need to add a line to the MSYS.OPT file and then use MUTIL function 9 to redefine the startup parameters:

```
PORT 5 AT $260 INT 4 SPEED
2400 NAME MODEM RADIOSPEED
1200 TNCTYPE 2
```

This line will be modified to allow you to put the port you wish to use in place of the values given. The name MUST be a "MODEM." Nothing else, just "MODEM." The SPEED parameter locks the modem into the speed that is stated. We use a 2400 baud modem and connects will only be allowed at 2400 baud. Those with 1200 baud modems are out of luck.

Use the EU (EditUser) function to add V1SIT to the list of users. We named this fictional character VISITOR and kept all other settings to those of a new user. Every once in awhile we must reconfigure the user back to a new user as someone sets the name or expert user status away from what it should be.

There needs to be a TNC file to initialize the modem. Here is the one we use:

ATZ	This line resets the modem.
ATSO=1	Causes a pick up after one ring.
ATQ1	Turns result codes off.
ATM1	Turns the speaker off after connect.

This file is named MYSYSTNC.2. It should be adequate for all Hayes compatible modems. Connect up your modem, boot MSYS and off you go.

Publicize It!

Now get a nicely formatted flier out and post it at schools, libraries and in newsletters. Place an informational message on all the landline PBBS systems you can get into. Get your flier into all the newsletters you can find. Send a message over packet to your >> LOCAL << area.

Before long, your dedicated (you thought this was free?) second phone line will be buzzing with all kinds of new users, licensed or not. You may find unlicensed persons requesting traffic be sent to a licensed friend. This can be done by intercepting the traffic and sending it under your call as third party traffic.

Now, get all these people who are unlicensed to get their license. Get lists of classes. Get lists of tests. In Ohio, Bob K3RC circulates a list of examination sites. A guy named Dave N8AUH circulates a list of hamfests.

LIST 0	List of all messages
WHAT	List of downloads
DOWNLOAD FILES.LST	List of available files
D README.DOC	Explanation about downloading
READ #	Read a message

PBBS Commands available for visitors.

All the clubs holding classes send area messages. Get these to your unlicensed people through an additional line in the MSYSMOD.MSG sign-on message, such as: "READ 39898! HAMFESTS IN OHIO!"

Every once in awhile, promote your port. More publicity . . . another note on the network and on other landline boards, more fliers. Amateur radio in your area is only as active as people make it. You have the ability to make it pretty danged active!

If you need further information, I am NO8M @ NO8M.OH.USA.NA. I can be reached at 27132 Butternut Ridge Road, North Olmsted OH 44070-4417. The modem port number is (216) 779-6350. Should all else fail, try the voice phone, (216) 777-1177.

Our thanks go to the membership of the North Coast Amateur Radio Club who support this port and to Mike Petchura, author of the MSYS PBBS software. RF

```
**********************************************************
          Welcome to the NCARC MSYS  Modem Port!
**********************************************************
For information on the system, use "I." To get a list of messages on the
      board, use the command "L 0." To see what is in the download
      section, use the command "W." (Use "D FILES.LST" and "D
      README.DOC" for information on how to get those files.)
      (A MSYS User's Manual is available and how to get it is in the
      file USER MAN.INF.) Please DO use this modem port for down
      loading the LONG files I have here . . . we have Part 97 of the
      FCC regulations and other very long files that are inappropriate
      for downloading by an RF link.
If you are interested in amateur radio and how to get your license, leave
      me a message (SP NO8M or SP SYSOP) and I will get you in
      touch with someone who can help.
Please DO NOT change the Name, QTH, etc. if youare checking in
      under the VISIT callsign. Now . . . Use the string VISIT for BOTH
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```


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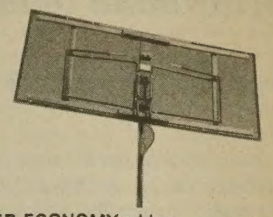

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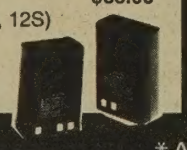

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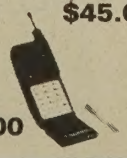

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CIRCLE 105 ON READER SERVICE CARD

Try a Transmatch

Multiband operation the cheap and easy way.

by Gary L. Foskett W1ECH

Not everyone has the time, space, or finances to put up a lot of antennas. However, it *is* possible to operate on most of the HF bands using just a single antenna. You'll get some interesting directive patterns, occasional gain, and you can operate practically anywhere you wish. However, unless you use a "trap" antenna, multiband operation generally requires use of an antenna coupler or "transmatch."

What's a "Transmatch?"

Transmatches have been around for many years. I built my first one in the '60s, and various transmatches have been in use at W1ECH ever since. With one of these magic boxes you just change a couple of taps on a coil, twirl a knob or two, and PRESTO—your antenna is "matched" (sort of). Anyway, it'll let you work people, and your rig will be happy!

Unfortunately, most commercially-manufactured transmatches also cost money—sometimes, a LOT of money. Moreover, even some "home-brew" transmatch articles have gone off the deep end, suggesting that builders construct elaborate monstrosities that can only be described as "labors of love." The purpose of this article is to briefly describe some basic transmatches, to show how little they can cost, to discuss how easy it can be to build one, and, finally, to tell you how to use one.

The *ARRL Antenna Book* or other references can give you a lot more technical details but, simply stated, a transmatch acts like a transformer: It matches the feedline coming from your rig to the feedline going out to your antenna so you can improve the transfer of power from your rig to the antenna. A transmatch allows your rig to operate at full power into a "good match"—and you'll probably hear better on your receiver, too.

Does a Transmatch Cost a Lot of Money?

A transmatch doesn't have to cost a lot; in fact, it can be downright cheap, especially if you can decide on which *kind* of antenna you want to match. Most hams use a transmatch for one of three types of antenna feedline: a simple, single conductor, like an end-fed "longwire;" a two-conductor "balanced" feedline, like 300 or 450 ohm "ladder line," used to feed the center of a half-wave dipole; or an "unbalanced" (coaxial) feedline, for dipoles, beams, etc.

Do you use all three kinds of antennas? A lot of commercial units (and some home-brew ones) cost a lot and get pretty complicated because they try to handle every conceivable type of situation. They include a lot of extra features that you may not really need! If you want to match just one type of antenna, why not build a transmatch for that—and leave out all the extra coils, switches, connectors, and other parts?

Is It Hard to Build One?

No, it really needn't be hard at all. Once you gather up the parts, you can probably put one together in an afternoon or an evening, for very little money, and without a lot of tools. The components don't have to be "exact," since tuning is tweaked and adjusted later, anyway.

A Basic Transmatch for End-Fed Wires

Figure 1 shows a basic transmatch circuit for simple end-fed wires. This is from the *ARRL Antenna Book*. I've built several versions of this one. As you can see, this is about as simple as you can get!

Figure 2 is a drawing of my QRP transmatch for end-fed wires. This was built one evening, about 15 years ago, for camping use. It consists of a small length of air-wound coil, an alligator clip lead, an RCA jack, a ground lug, and a small variable capacitor, all mounted in a little 5" x 5" x 4" plastic "freezer" box! The cover seals the unit against rainy weather, and the box has enough extra room for the entire rolled-up antenna! Incidentally, simple coils and alligator clips are fine for QRP. You really don't need exotic connectors, rotary inductors, fancy switches, or other high-priced parts. I run my QRP transceiver's output through a couple of feet of very small 52 ohm RG-174 coax into an RCA jack on the back of the box. The RCA shield connects to a ground lug, and an alligator clip lead from the "hot" conductor on the RCA connects to the coil a few turns down from the "hot" (antenna end). Obviously, since the box is insulated, you must remember to run ground leads where needed.

Using the End-Feed Transmatch

It's easy to adjust the transmatch shown in Figures 1 or 2, but you will need some means of checking your SWR. Use the built-in SWR meter in your rig, if it has one, or use a separate SWR meter between the transmatch and the rig.

The first time I tune up on a new antenna, I clip the center conductor of the coax from the transmitter to perhaps the 5th turn from the "hot" (antenna) end of the coil. I then find a clear spot on the band, key the transmitter, and tune the capacitor for lowest SWR. *Never key the transmitter while you are handling the clip*; even QRP can give you an RF "bite"! If the best (lowest) SWR is still too high, I stop keying the rig, move the clip a turn or two in either direction, and try tuning the capacitor again. After a few tries, I can usually "match" almost *any* piece of wire, in any portion of any HF band, provided the wire is at least a quarter wavelength long on the lowest band.

When I have an SWR of 1:1 (or close to that), I make a note of which turn on the coil best matched the antenna on that band. This speeds up tuning next time I operate there.

You can use the transmatch shown in Figure 3 with parallel 300 or 450 ohm line to feed a typical center-fed multiband antenna (also called a "center-fed Zepp"), my favorite all-band antenna at home. The approach is somewhat similar to the currently popular G5RV, except that no coax or balun are used in the feedline. With parallel "tuned feeders" and a transmatch, the antenna can be virtually any length, from about 90 to 150 feet or more long—whatever reaches between two trees.

This transmatch is a *little* more involved, because the antenna is a balanced system. You'll need a dual-section, variable "main tuning" capacitor (C1) across the main coil (L1), plus a second single-section capacitor (C2) for "link" adjustments. You also have to include a second "link" coil (L2); however, L2 can be made by just cutting and isolating three or four turns in the center of coil L1, as shown in the diagram. C1 needs more substantial spacing between the plates because voltages can be high, but C2 can still be quite small. In my transmatch, I have also added a toggle switch and a fixed 0.0002 µF capacitor to ground, in parallel with C2, for needed extra capacitance on 80 meters.

As with the other transmatch, tuning is a matter of finding the best tap combinations for each band—again, *changing taps only when the rig is on standby*. Try different settings: Move the two antenna clips, as well as the two clips that short out parts of the main coil; key the rig; and then tune both capacitors for the lowest SWR. Keep each pair of clips equally spaced either side of the center of the coil.

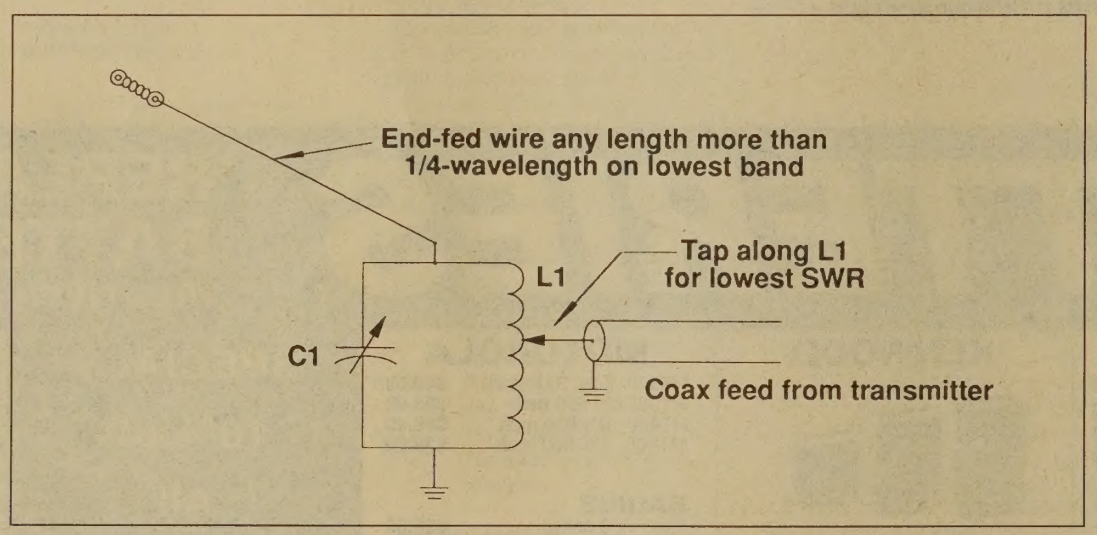
End-fed wire any length more than 1/4-wavelength on lowest band
L1
Tap along L1 for lowest SWR
C1
Coax feed from transmitter

Figure 1. Basic transmatch for single end-fed wires.

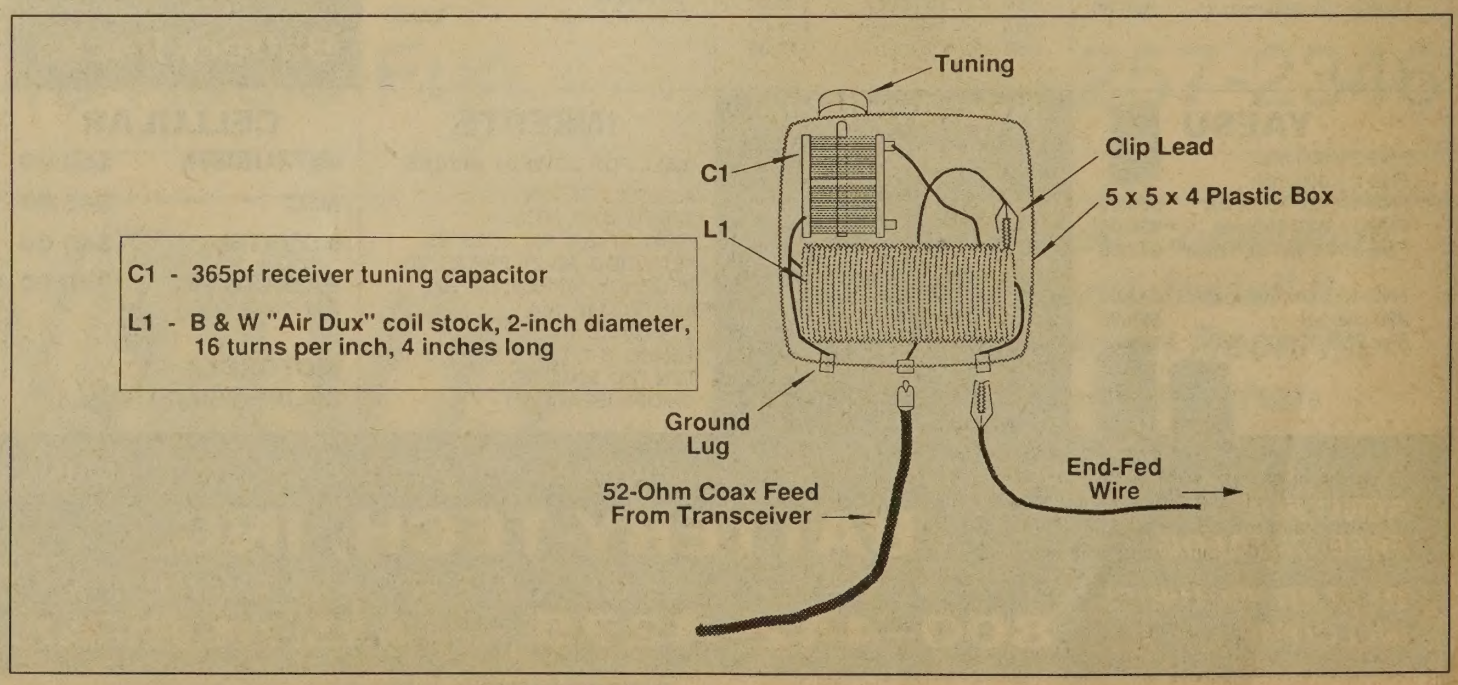
Tuning
C1
L1
Clip Lead
5 x 5 x 4 Plastic Box
C1 - 365pf receiver tuning capacitor
L1 - B & W "Air Dux" coil stock, 2-inch diameter, 16 turns per inch, 4 inches long
Ground Lug
52-Ohm Coax Feed From Transceiver
End-Fed Wire

Figure 2. Construction details for the W1ECH "QRP Special" transmatch.

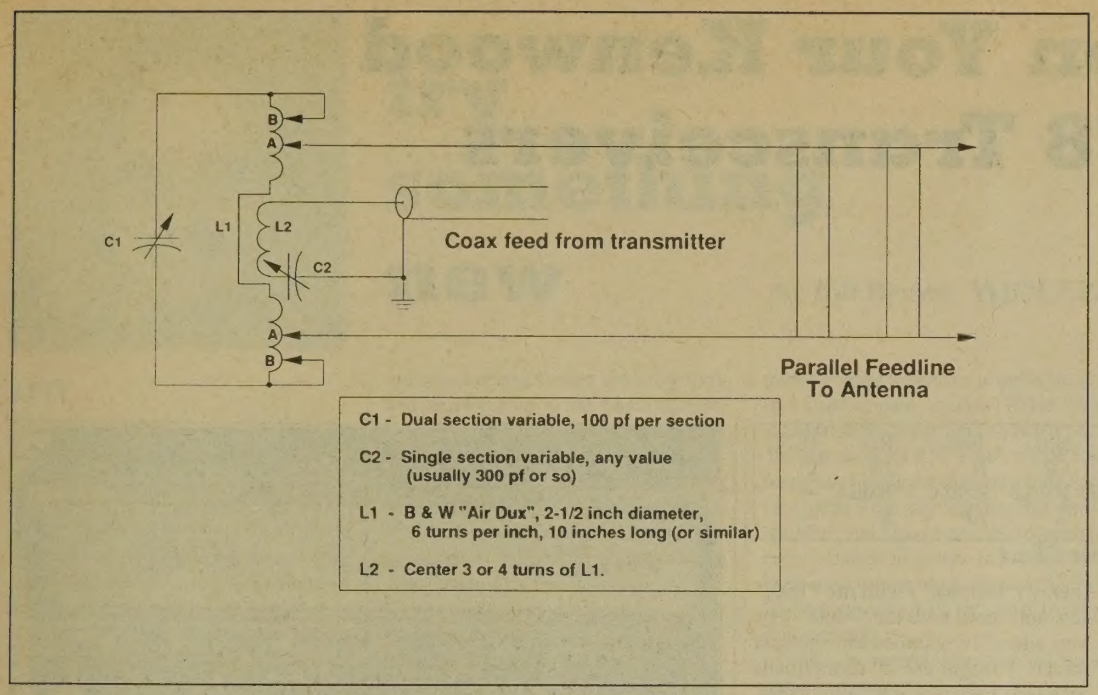
B
A
C1
L1
L2
C2
Coax feed from transmitter
A
B
Parallel Feedline
To Antenna
C1 - Dual section variable, 100 pf per section
C2 - Single section variable, any value (usually 300 pf or so)
L1 - B & W "Air Dux", 2-1/2 inch diameter, 6 turns per inch, 10 inches long (or similar)
L2 - Center 3 or 4 turns of L1.

Figure 3. Basic transmatch for "balanced" two-conductor feed.

Tuning usually gets sharper as the clips are moved closer together toward the center of the coil, so try to keep the clips as far apart (away from the center) on the coil as you can. This will provide a broader dip in SWR.

After you've gone through the "cut and try" adjustments to find the lowest SWR, mark the taps and tuning settings down for each band so you can change bands quickly in the future.

I've used this kind of transmatch, with 450 ohm "ladder line," at my home station for many years. It permits me to use an 80 meter half-wave antenna on *all* bands from 80 through 10 (including the newer WARC bands)—and my rig always "sees" a 1:1 SWR on all bands.

Where Do I Get the Parts?

You can usually buy coils, alligator clips, insulators, and most other parts from local radio parts stores (like Radio Shack) or from various other suppliers. Variable capacitors can be a bit more difficult, but sources are advertised in amateur radio magazines. Look around at flea markets (the radio kind!) and in friends' junk boxes, too—or ask any "old-timer" (like me!) you may know. Even old broadcast radios can sometimes yield variable capacitors usable for up to 100 watts.

To tune various bands, you must change clip leads on the coil, so you may not want to put your transmatch in a cabinet. Except for my little QRP unit, my transmatches are constructed on a metal chassis, with only a front panel for the tuning capacitors. They don't look as pretty as commercial units, but I bet they work at least as well.

Try a Transmatch!

Obviously, in a brief article like this, it is impossible to discuss all aspects of transmatches or multiband antennas. However, my little plastic-box QRP transmatch cost me less than $10, and has enabled me to work a lot of great DX with low power and simple wires. In just a few hours of operating during a one-week outing to Maine last summer, I used this transmatch and about 80 feet of speaker wire, 20 feet high, to work *51 countries*, on all continents, using my old Argonaut 505 and just *2 watts* output.

My home station transmatch has been rebuilt a couple of times, but it has served me well. I recently built another one for around $25. (The same transmatch, with alligator clips, will even work with a kW amplifier, but that can be tricky, so I don't recommend it!) I confess that I've never used a transmatch for coaxial feedline. The few coax-fed dipoles or beams I've ever had were single-band antennas, cut to length or otherwise matched at the feed point—the best way to match *any* antenna. I've used nothing but wire antennas for the last 23 years. During that time, I've reached the 330 country DXCC mark, and have occasionally done fairly well in contests, too.

If you've ever wanted to try loading up a wire antenna on several bands, try a simple transmatch. You'll love it! RF

Parts List

W1ECH QRP Special:

C1	365 pF receiver tuning capacitor
L1	B/W "Air Dux" coil stock, 2" diameter, 16 turns per inch, 4" long

Transmatch:

C1	Dual section variable, 100 pF per section
C2	Single section variable, any value (usually 300 pF or so)
L1	B/W "Air Dux," 2-1/2 " diameter, 6 turns per inch, 10" long (or similar)
L2	Center 3 or 4 turns of L1

QSO Japan

by Patrick H. Bailey K7KBN

I'm not sure what the 40 meter CW band sounds like at your QTH, but here in western Washington, around 1200Z, the JAs can be heard quite reliably. Many of them, in fact, appear to be participating in a New Jersey QSO Party, judging from what they seem to be sending. You may have heard them on other bands, calling "CQ NJ," with the "NJ" run together as in "SK," "AR," and the other standard CW procedure signals.

During a particularly interesting round-table SSB QSO with a couple of JAs several years ago, I observed that New Jersey must be considered quite rare from Japan since so many directional CQs seemed to be aimed that way. When they recovered from the spate of laughter that followed, they introduced me to a new subworld of communications.

Wabun

The same international law that requires U.S. hams to demonstrate proficiency in the International Morse Code (IMC) in order to transmit on the HF bands applies to the Japanese. In addition to the IMC requirement, however, a Japanese ham must demonstrate proficiency in what is called "wabun" in order to obtain a higher class of license. Wabun is made up of dits and dahs in the standard 1:3 ratio, but each pattern of sound represents a syllable rather than just one letter. This makes wabun quite efficient because if you send "SAYONARA," for example, that's eight letters; therefore, eight sound patterns. The word has four syllables, and when sent in wabun, it requires only FOUR sound patterns:

SA = NK (sent as one character: DAHDIDAHDIDAH)
YO = M
NA = R
RA = S

The explanation of the "NJ" is that just as "SK" means "end of transmission," "NJ" (to a Japanese ham) means "the transmission which follows is in wabun." This just alerts the ham on the other end of the QSO so he or she doesn't lose any of the QSO in confusion over which language is being used. "CQ NJ" simply means that the sender is trying to establish a QSO in wabun, NOT NECESSARILY in New Jersey unless the W2 is reasonably proficient in wabun.

My SSB QSOs with Japanese hams are always a pleasure for me, especially when I use the few words of Japanese I still remember from my Navy days (and that are appropriate for transmission over the air!). Usually I will end a QSO with "MATA O AISHIMASHOO, SAYONARA," meaning loosely, "see you later, goodbye." This usually elicits glowing comments about how good my Japanese is, and a similar benediction from the JA. I have my memory keyer programmed to send that same phrase in wabun, and if the JAs comment favorably about my spoken Japanese, they often seem absolutely astonished that I (actually my memory keyer) can speak wabun. I've found it necessary to keep a tape recorder handy so I can translate what I'm being told in wabun at 40 wpm, syllable by syllable, into phonetic Japanese, thence to English.

Table I lists a partial Japanese phonetic alphabet, along with each syllable's wabun equivalent in IMC. If you're bored with regular CW, orient your antenna (pun definitely intended), and give it a try. At least drop a:

START WABUN	NJ
MA	X
TA	N
O	AS
A	MW
I	A
SHI	MR
MA	X
SHO	MR M-U
	AAA
	(REGULAR
	PERIOD (.)
SA	NK
YO	M
NA	R
RA	S

at the end of your next solid QSO with a JA. Chances are you'll get a favorable response, at least.

In Table I, under "send," you see what to send in International Morse Code to produce the wabun syllable. Where there are two letters, they have to be sent as one sound pattern. For example, in the word SAYONARA, the first syllable "SA" shows up as "NK," which must be sent as DAH-DIDAHDIDAH. Further along in the alphabet are what are called "turbid sounds," such as "GA," which shows up as "L-I." This calls for the IMC letters L and I, sent as separate characters. The syllable "GI" is "ND-I," which would be sent as DAHDIDAHDIDIT DIDIT.

The syllable "N" shows up by itself; this is the only consonant sound with which a Japanese syllable can be ended—as in WABUN, or more commonly as in the honorific "-san."

A few caveats: First, not every Japanese ham knows wabun. Most will at least recognize "sayonara," however. Second, this is not intended to be an exhaustive course in Japanese or wabun; some of the less frequently used syllables have been left out of Table I. And, of course, you may be in QSO with the Ted MacElroy of wabun. If that happens, "GOMEN NASAI!" RF

Table I

Syllable	Send	Syllable	Send	Syllable	Send
__A	MW	NA	R	RA	S
I	A	NI	C	RI	G
U	U	NU	H	RU	KN
E	KM	NE	Q	RE	O
O	AS	NO	IM	RO	AA
KA	L	HA	B	WA	K
KI	ND	HI	MU	WI	AU
KU	V	HU/FU	Z	WU/U	U
KE	Y	HE	E	WE	AD
KO	MM	HO	D	WO	J
SA	NK	MA	X	GA	L-I
SI/SHI	MR	MI	UA	GI	ND-I
SU	OA	MU	T	GU	V-I
SE	WN	ME	BT	GE	Y-I
SO	MN	MO	DN	GO	MM-I
TA	N	YA	W	ZA	NK-I
TI/CHI	F	YI/I	A	ZI/JI	MR-I
TU/TSU	P	YU	DM	ZU	OA-I
TE	AW	YE/E	KM	ZE	WN-I
TO	UI	YO	M	ZO	MN-I
DA	N-I	BA	B-I	PA	B-UN
DI	F-I	BI	MU-I	PI	MU-UN
DU/ZU	P-I	BU	Z-I	PU	Z-UN
DE	AW-I	BE	E-I	PE	E-UN
DO	UI-I	BO	D-I	PO	D-UN
N	AR				

Fun and Games on Your Kenwood TM-741 and TH-78 Transceivers

by Gordon West WB6NOA

Imagine your new mobile or handheld radio turning into a sophisticated game machine! That's exactly what is hidden behind some of the buttons on the new Kenwood triband TM-741 mobile unit and the new Kenwood TH-78 dual-band handheld. Look at all of the fun you can have:

TM-741 Mobile	TH-78 Handheld
Slot machine	Poker card game
Shooting game	Memory recall game
Music machine	

Now, before I tell you how to play fun and games on your new Kenwood equipment, let me remind you that only these two specific sets will go into the game mode.

"Kenwood USA does not guarantee nor support these game functions," comments Craig Martin of Kenwood Technical Support. "That is to say, if they do not function as described in the article, we cannot fix these functions. They are for owner amusement, and we do not offer any guarantee on the performance or suitability of these hidden features," adds Martin.

I would hasten to point out that playing these games while driving a vehicle is dangerous, and quite frankly, nuts. Even in heavy L.A. freeway traffic, I wouldn't consider it for a second. If you're going to play fun and games with your Kenwood mobile or handheld, do it when you are parked and have a few hours to kill.

The TM-741

Slot Machine Game: To enter the game mode on your mobile TM-741, hold the "F" key and the "Mute" key, and switch the power to "On." Numbers 1-2-3 will show up on the display. Band "SEL A" will select roulette. Band "SEL B" and "SEL C" are for the other two game modes. Press the "VFO" key to select the "A" band.

In the slot machine mode, the display shows "000," and the transceiver enters receive mode with the power turned on. Press the "Mute" key, and the slot machine goes into action. Push band "SEL A" to stop the left digit, band "SEL B" to stop the middle digit, and band "SEL C" to stop the right digit. If the three digits all match, the LED and illumination lamps flash, and sound effects reward you with three same numbers in a row. And, if you should hit numbers 1, 2, and 3, a major fanfare will be sounded from your rig. But if all you get are three random numbers, you will also get the appropriate sound effect. Try, try again.

Shooting Game: You can launch your mobile Kenwood into a shooting game by selecting "SEL B." When the shooting game starts, your score is shown in display section "A," and cannon balls, target, and remaining cannons are shown in display section "C."

Press the "Low" key to start the game. The "Number" attacks from the left of display "B." Take aim at the enemy ("Number") with the "Tone" key, and shoot with the "Mute" key. You win if 16 enemies are shot per screen. You can use 30 cannonballs per screen. Each time you clear a screen, the speed increases. If eight screens are cleared, the first screen returns, and the process is repeated. Play around with this; after you figure out what's going on, it's fun.

Key	MR	MHz	Call	F	Bell	Tone	Rev	DTSS
Tone	A	A#	B	C	C#	D	D#	E
Key	Mute	CSELA	BSELA	CSELB	BSELB	CSELC	BSELC	—
Tone	F	F#	G	G#	A	A#	B	—

Mobile Music Chart

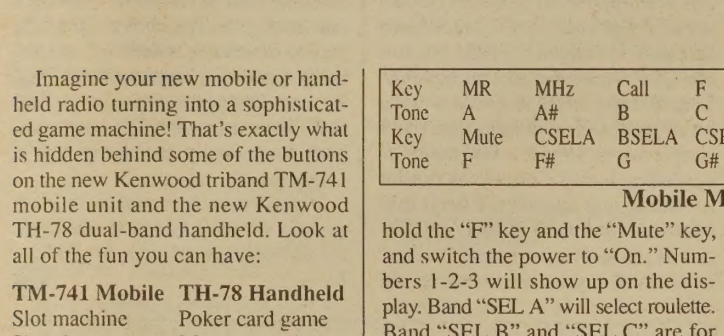

Photo A. Slot machine game. We almost won!

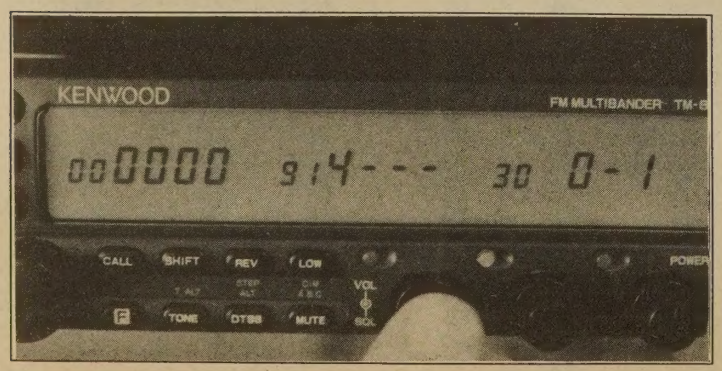

Photo B. Shooting game.

Mobile Music: The "SEL C" band brings up the music game. When the music feature is selected, "Enjoy sound play" is displayed. See the sidebar for the tones that can be produced.

If you are a musician, try your hand at playing a tune using any one of 15 different buttons. The tunes are not sent out over the airwaves; they are generated only in the audio section of your mobile transceiver. So have fun!

The Kenwood TH-78 Handheld

To enter the game mode on your hand-held transceiver, first turn your unit off. Now hold down the "PTT" and "M" keys, and switch the power "On." (To exit the game mode, press the "Lamp" key.)

Memory Game: The memory game uses the seven-segment display of the LCD. In this game, the microcomputer outputs a character string. You answer by keying in the same character string. Each character is 1, 2, 3, or F. When the game begins, the character string is one digit long.

Each time you answer correctly, an additional random digit is added to the character string until the string becomes 20 digits long. If you answer correctly for the 20-digit character string, you get 100 coins that may be used in the poker game. The memory game then ends, and the poker game begins.

Example: A random digit is generated, such as the number "2." Press the number "2" key. If you were correct, another random digit is generated, such as the digit "1." Now press the "2" and "1" keys in that order. If you are correct again, another random digit is generated, such as "F." Press the "2," the "1," and "F" keys in that order. Each time you answer correctly, a digit is added. If you can get up to 20 digits a fanfare sounds and a message appears.

Poker Game: If you obtain 20 points in the memory game, you can play the poker game. When the poker game starts, you must place your bet. "Bet 01" appears on the 13-segment display. Select "1" to "10" for the bet by pressing the "Up" and "Down" keys, then press the "F" as an execution key.

Photo C. Play your own tunes on the 741. The tones will NOT transmit.

Five cards are displayed face down on the 13-segment display. One of them is turned over at a time. The number or letter indicates the number of the card. To see the suit, press the "PTT" key. The suit is displayed while you hold the key down. "H" is hearts, "S" is spades, "D" is diamonds, and "C" is clubs.

You can change the card for a new one only once. Press one of the keys, "1" to "5," corresponding to the number of the unwanted card to turn it over. Several cards can be turned over.

After you have selected the unwanted card, press the "F" execution key. A new card is picked up. The microcomputer checks your cards. If you do not have a hand, a beep sounds and you have lost. Place another bet. If you have a good hand, a warbling sound is output, the hand name and odds are displayed, and the current bet on the seven-segment display at the right increases.

If you have a hand, you can try the "big or small" challenge. "Big or Small" is a game in which you guess whether a face-down card is greater, or smaller, than 8. If you guess correctly, the bet is doubled. If you do not want to try the "big or small" challenge, press the "Low" key to cancel. The bet on the seven-segment display at the right is added to the points on the seven-segment display at the left, and you can place another bet.

Here are some keys that you need to remember:

#1 key	Used to select a card to be changed.
#2 key	Used to select a card to be changed; functions as the up key to determine the bet; and as the big key for "big or small."
#3 key	Used to select a card to be changed.
#4 key	Used to select a card to be changed.
#5 key	Used to select a card to be changed; functions as the down key to determine the bet; and as the small key for "big or small."
F key	Used as the execution key.
Low key	Used as the cancel key.
PTT key	Used to see the suit; the suit is displayed while you hold the key down.

Photo D. Memory games with the 78A handheld.

Odds

Two pairs	2P 2	X2
Three cards	3C 5	X5
Straight	ST 8	X8
Flush	FL	X10
Full house	FH	X20
Four cards	4C	X50
Straight flush	SFL	X100
Royal straight flush	RSF	X500

This gives you an idea of some of the games you can play with your new Kenwood mobile or hand-held transceiver. NEVER ATTEMPT TO PLAY A GAME WHILE DRIVING A CAR, OR WHILE WALKING. YOU COULD QUITE POSSIBLY CRASH THE CAR, OR INADVERTENTLY WALK INTO THE MIDDLE OF THE STREET AND GET MOWED DOWN.

Have fun with some of these games, and who knows what else might be hiding behind your new Kenwood transceiver! RF

try something new

by Bill Brown WB8ELK

RTTY

Tune around the high end of the CW portion on the HF bands and you'll probably hear a number of very musical sounding signals. This is the distinctive sound of Radio TeleTYpe (RTTY). RTTY (pronounced "ritty") is a form of digital communications that has been around for decades. *[Ed. Note: Wayne Green W2NSD/1, the Publisher/Editor of* 73 *and* Radio Fun, *started out in the publishing business during the early 1950s with a newsletter about RTTY called "Amateur Radio Frontiers."]*

RTTY is one of the easiest modes to use and, if you own a home computer, requires only a modest interface and program to join in the fun. For the more adventurous, you might want to refurbish one of those huge military green teletype units with the rolls of yellow paper that appear at hamfests. They can usually be obtained for a song—sometimes just an offer to cart it away will suffice. These mechanical units were the mainstay of amateur teletype during the early days and are a lot of fun to use. Much has been written in *73 Magazine*, both in articles and in the "RTTY Loop" column (written by Marc Leavey WA3AJR), concerning modifications to these units and how to get them up and running. Just don't expect anyone in your household to sleep while you are operating RTTY with one of these—they are very noisy!

Shifty Characters

The individual characters in a RTTY signal are usually represented by a 5-bit digital code (1's or 0's) called Baudot. You will also hear ASCII teletype transmissions which use a 7-bit code that enables the full range of letters and special characters to be sent.

On the HF bands, the RTTY digital signal is determined by either a Mark (representing a "1") or a Space (for a "Ø") tone. The normal transmitter frequency represents a Mark condition. Whenever a Space condition is encountered the transmitter's output frequency is shifted down by a fixed amount, usually 170 Hz. This is known as Frequency Shift Keying (FSK). You can also send RTTY with a VHF FM transmitter using a technique called AFSK (Audio Frequency Shift Keying) where the Mark and Space tones are represented by a shifted audio tone (a tone of 2125 Hz is used for the Mark signal and 2295 Hz [when using 170 Hz shift] for the Space signal).

There are several frequency shift standards in common use. The most popular shifts are 170 Hz and occasionally 850 Hz. You may also encounter other shifts (such as 425 Hz), particularly when listening to commercial RTTY signals. There are also several transmission speeds used. The more common speeds are 60, 67, 75, 100 and 133 words per minute (also referred to as 45, 50, 57, 75 and 100 baud).

Terminal Units and Software

To separate and decode the Mark and Space tones you will need a Terminal Unit (TU) or a multimode controller. A Terminal Unit essentially contains very sharp audio filters which separate the Mark and Space tones when you properly tune in a RTTY signal. When perfectly centered, the higher frequency tone will only pass through the Space filter and the lower tone will only be heard through the Mark filter in the TU. This Mark and Space signal can be decoded by your home computer using an appropriate RTTY program. If you own a multimode controller, it will make the conversion from the 5-bit Baudot code to standard 7-bit ASCII and send it to your computer's serial port. All you need is any terminal or communications program to display the RTTY signal on your computer screen. In many cases the RTTY program or controller will automatically decide which speed or shift standard is being used. If your controller or program won't do this, you need to try different selections until you hit the right mode.

Where to Find It

To tune in a RTTY signal, set your rig up for LSB operation (on all HF amateur bands). Since the transmitted Mark signal is higher in frequency than the Space signal, Lower Sideband mode is used since most decoders need the recovered audio Mark tone to be lower than the Space tone.

Tune into the signal very carefully until you get a good printout on your monitor (or printer). Some controllers or TUs have an LED bargraph readout that allows you to visually tune in the RTTY signal. A number of TUs and controllers also have a Mark and Space output that you can feed into the horizontal and vertical inputs of an oscilloscope. Proper tuning is accomplished when you see a balanced vertical and horizontal cross pattern on your scope.

Common RTTY Frequencies

160m	1.800- 1.840 MHz
80m	3.605- 3.645 MHz
40m	7.080- 7.100 MHz
30m	10.140-10.150 MHz
20m	14.070-14.099 MHz
17m	18.100-18.110 MHz
15m	21.070-21.100 MHz
12m	24.920-24.930 MHz
10m	28.070-28.150 MHz

Operating Habits

If you hear a RTTY signal with a very distinctive and consistent tone or rhythm, the chances are that it is a CQ or test signal to allow other stations the opportunity to tune them in. Quite often you'll see a signal that consists of a long series of Rs and Ys, i.e. "RYRYRYRYRY," before the text message begins. This sequence has historically been used during the beginning of a transmission because the R and the Y are the digital inverse of each other in the Baudot code: An R is represented by "01010" and ahe Y is "10101." As a result, the Mark and Space tones are transmitted at a very steady and equal rate and are easy to tune in.

To establish a RTTY contact, look

Continued on page 12

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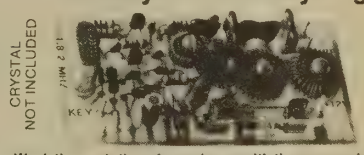

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try something new

Continued from page 11

around for a CQ transmission (usually a couple of sequences of ten CQs followed by the callsign). Then just give the station a quick call with just a few repeated callsigns. If you have the other station tuned in properly, chances are that they will copy your signal just fine and won't have to retune.

After establishing the contact, you might want to send the other station a few paragraphs about your station, location and personal info. You can have this data stored in a computer file and send it out with a the push of a button. That way you can just sit back and let your computer do all of the work. This was called the "brag tape" in the good old days when punch tape was used.

To find RTTY activity, refer to the sidebar for the common frequencies used. Most RTTY activity occurs on 20 meters during the daytime hours and on 80 meters at night.

I think you'll enjoy radio teletype operation. It's a fun way to enjoy the advantages of digital communications without busting the piggy bank. Used TUs and RTTY/CW decoders are usually available very economically at hamfests. Even in the new market, you'll find some real deals on interfaces that don't include packet. RF

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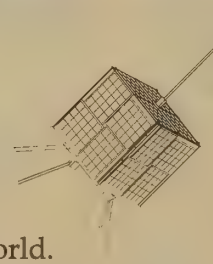

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Dream Flight Wausau

Fred Prehn WX9W has received the 1992 Advanced Electronic Applications "AEA Amateur Ambassador" award for his work on a project called "Dream Flight Wausau." This was an educational experiment involving amateur radio and centered around a simulated space shuttle mission. Approximately 750 students from the Wausau, Wisconsin, school district participated in the project that made extensive use of amateur radio as a communications facility and included packet and ATV in addition to other traditional means. The ATV signal was also provided to local cable television companies so that the six-day event could be viewed by the entire community. An estimated audience of 20,000 watched "Dream Flight Wausau" unfold in their living rooms, thus giving the project and amateur radio very positive community exposure. In recognition of this achievement, Prehn was treated by AEA to a trip to the recent ARRL National Convention in Los Angeles, and given a $1,000 cash award. *TNX Westlink Report, #634, September 25, 1992.*

SWLing and Scanning BBS

KC1UA now runs a specialty BBS in Hyannis, Massachusetts, catering to SWLing and scanning exclusively. It recently added a phone port to the system. Connecting to it is very similar to connecting to it via radio, but it allows the opportunity of much greater throughput as well as the downloading of binary files. It has countless files available pertinent to the SWLing and scanning hobbies, and is starting to add IBM shareware programs and WEFAX.GIF files as well. In addition, the BBS also supports speeds of up to 9600 baud, using an Okidata Okitel 9600 v42.bis modem. If you'd like to check into the system via the phone port, please send a reply to KC1UA@KC1UA.#EMA.MA.USA.NA. At that point he will send you the phone number and an interim password, which you will be asked to change to something permanent once you're online. *TNX Westlink Report, #634, September 25, 1992.*

Boy with Ham Radio Cool in Crisis

The calm during the storm was 14-year-old Kevin Boudreaux N5XMH of Terrytown (Louisiana). Equipped with a ham radio, Kevin monitored the shelter at O. Perry Walker High School in Algiers (Louisiana) as New Orleans waited for Hurricane Andrew. For 13 hours, Boudreaux kept up communications with the Red Cross headquarters in New Orleans. "He remained so calm and mature. He did a great job," Red Cross worker Michelle Hassell said.

On the evening of Aug. 25, members of the Amateur Radio Emergency Service teamed up with the Red Cross at shelters throughout Louisiana.

"It was obvious that we were under a serious threat and operators were needed to establish lines of communication," Gordon McCraw KA5YDJ, state emergency coordinator of the Amateur Radio Emergency Service, said.

ARES is a nationwide volunteer radio communications service of more than 25,000 amateurs who operate radio channels during public crises.

One of the district coordinators contacted Boudreaux's father, Denis N5UGE, for help. Denis Boudreaux is a licensed ham radio operator. He could not help ARES out because he had committed to work with another ham radio group during the Hurricane Andrew threat.

Boudreaux overheard his father's conversation and offered to fill in with the Red Cross.

"At first we were very hesitant, but we knew he was capable," Kevin's mother, Linda Boudreaux, said.

Boudreaux arrived at Walker at 7:30 p.m. with a container of water, an ice chest of drinks, a pad and a pencil, and his ham radio. I had to use an antenna that I made myself in order to have a wider range than I usually have," he said.

"At first I set up in the gym, but it got real crowded and there was no air conditioning," Boudreaux said. "I think there were 343 people there around 3 a.m." They soon moved to hallways and to the cafeteria.

Through the night he reported in to McGraw and the Red Cross personnel. He also checked in with his mom and dad, and they listened to his calls.

"I had to be sure he was OK," his mother said.

Melvin Davis with the Red Cross praised Boudreaux's efforts. "He did something that many grown-ups wouldn't be able to do," Davis said. Davis intends to nominate Boudreaux for Volunteer of the Year Award.

Boudreaux became interested in ham radios when his father got a license. He took classes at JoEllen Smith Medical Center in Algiers through the Westside Amateur Radio Club and received his license in November 1991. His mother is also a licensed ham operator.

Boudreaux is a freshman at Livaudais Junior High School in Terrytown, where he also plays trumpet in the band. He also belongs to a support team called REACH America. REACH stands for Responsible, Educated Adolescents Can Help.

If another storm threatens New Orleans, Boudreaux said he will be ready.

"I'm sorry about all the devastation, but I enjoyed helping out and I'd definitely do it again," he said. *By Phyllis Robert, the Gretna Picayune, September 6, 1992. Reprinted by written permission of the Times Picayune. TNX to B. C. Lawson N5PWZ for sending the article.*

Packet in the Classroom

KB8AST is looking for teachers who have packet systems in operation in a classroom setting or at home. He is collecting the information and will share what he has with you. To date, he has collected data on approximately 35 packet stations either presently on the air or in the planning stage. Also, if you are planning to start a ham station in a school/classroom setting where the idea is to acquaint schoolchildren with amateur radio, he can put you in touch with ham-teachers and others who presently are on the air and active in a classroom atmosphere. Send your call and the BBS where you receive your mail to: KB8AST@KB8AST.#NEOH.OH.USA.NA. *TNX Westlink Report, #634, September 25, 1992.*

South Carolina School Shuttle Contact

by Jim Brown WM3O

As director of the Stanback Planetarium at South Carolina State University in Orangeburg, South Carolina, and as an amateur radio operator (WM3O), my connection with SAREX seemed very logical. Since one of the goals of planetariums is to promote astronomy and space science education, what better location to establish a SAREX contact than from my work QTH?

In the summer of 1991 I applied to the ARRL for permission to participate in an upcoming SAREX flight. On December 20, 1991, I was notified that there would be a good chance that we would be chosen to participate in the upcoming STS-45 SAREX flight.

With this in mind I approached Mr. Heyward Bozard N4VFK, computer analyst for the Orangeburg County School District, and presented the information. Together with Ms. Anne Neeley, public relations officer for the district, we made contact with the middle schools and set up a theme contest to select 10 students from within the district's middle schools.

While this process was underway I approached the Edisto Amateur Radio Society (E.A.R.S.) and solicited the help of a number of club members. Mr. Boby Mixson N4WPJ, Mr. Marty Diggins KO4BR, Mr. Gary Blankenship N4MCF, Mr. George Cone WB4TGK, Mr. Mike Cone KB4REI, and Mr. Harry Shroat N4XMY all volunteered to help with the project. Marty KO4BR and George WB4TGK are both members of the Southern Bell Telephone Pioneer Amateur Radio Society, and suggested that perhaps the Pioneers would be able to help.

A few weeks later Marty came back from a meeting with Mr. Jim Reeves WX4M of the Pioneers with the promise of a complete OSCAR satellite station, including a brand-new Kenwood TS-790A, a brand-new Hygain 218S complete OSCAR antenna system, a brand-new Yaesu G-5400B azimuth/elevation rotor, hardline, power supply, amplifier/pre-amplifier; in short . . . the works! I can't begin to express my appreciation for the work and effort all these people did to make our SAREX contact a success.

The SAREX Contact

When the day of the contact was upon us, the students had been selected, rehearsals completed, and the media informed. We all listened in to the orbit before ours to check for signal strength and to practice tracking the orbiter with our OSCAR system. We heard N5WQC contact a school somewhere in New England and we had perfect reception. Their signal was S9 +10, and the audio was clear and solid. Our tracking was made simple as we had STS-Plus software running on a PC-clone that I use to run the Planetarium. Its output can be given in altitude and azimuth, as well as in a graphic display of the orbiter in relation to our ground location.

About 4:00 p.m. EST, 24 minutes before the contact, everyone began to show up: TV crews, newspaper reporters and photographers, radio crews and, of course, the students, family members, representatives from the Orangeburg School District, university staff, and club members. In a short while we would be attempting to make the first successful contact with the Space Shuttle from South Carolina.

About 15 minutes before the contact, the Johnson Spaceflight Center called to make sure everything was on track and to tell us that they would stay on the phone throughout the pass. The kids were anxious and the atmosphere in the theater was tense. As we counted down from T-30 seconds, I opened up the squelch on the radio, and on the directions from JSC began calling the Shuttle: "N5WQC, N5WQC, N5WQC this is WM3O at South Carolina State University, over . . ." Nothing—no answer, only static. Again, and again, and by now we were fully two minutes into our pass and still nothing. Then, finally, out of the static, "WM3O, this is N5WQC." But what had happened to the beautiful signal that we had heard on the previous orbit? No time to ponder this. I had to hope that the people manning the antenna controls had us on track. I quickly confirmed contact and got the first student up for his question. The answer came back, but while the signal was strong, the audio was so weak that it was difficult to understand. Another student and another answer. As the third student finished his question, the signal had dropped noticeably. I had the volume of the TS-790A wide open but the noise was overpowering the audio from the shuttle, and it finally faded into nothing. Then, it was over. TV interviewers swarmed in quickly to get their interviews and make it back to the station for the 6 o'clock news. I kept hearing questions being asked to the kids, " . . . were you disappointed?" And to my surprise, most of the answers were to the effect of yes, but it was exciting to be a part of the project, and they did, after all, get to hear the astronaut live, something that they had never done before.

The 6 o'clock news was mixed: one station praising our efforts, and another playing up the static and poor reception. The newspapers were kinder and also praised our efforts.

Adults, back row left, to right: Boby Mixson N4WPJ, Jim Brown WM3O (director of Stanback Planetarium, South Carolina State University, where the SAREX contact took place), Mike Cone KB4REI, George Cone WB4TGK. Student SAREX participants, back row, left to right: Imari Wright, Jamie Danford, James Williams, Jason Stone, Yasha Kdadkodayan; front row, left to right: Samantha Horner, Jennifer James, Beth Crawford, Tasha Wheeler, Tina Middleton. Other adult members of the Edisto Amateur Radio Society who assisted in the SAREX project but are not present in the photograph are: Marty Diggins KO4BR, Heyward Bozard N4VFK, Gray Blankenship N4MCF.

What Happened?

We were in the right place with the right equipment. We had the best equipment that money could buy and it didn't help. What happened?

I placed a call to JSC and spoke with Roy Neil K6DUE. He told me that they had monitored on amateur gear there every SAREX pass of the mission to that point and had not had any trouble hearing the astronauts . . . until our pass. He told me that they heard nothing from the Shuttle. Whether it was a faulty connection between the mike plug and the SAREX transmitter or whether it was the orientation of the orbiter, I have not been able to find out. Everyone has been sympathetic, especially Roy K6DUE, who suggests that we try again in the near future.

All in all, many people put many hours into this project. We would not have been as successful as we were without the help and support of the Southern Bell Telephone Pioneer Amateur Radio Society, the Edisto Amateur Radio Society, Orangeburg County School District, and South Carolina State University. Was it a success? In our opinion, yes. Were the kids excited? Yes. We even planted the idea of having an amateur radio class, to be taught in the Gifted and Talented classes. Did we promote amateur radio to the public? Yes, and more so, since it made statewide coverage in newspapers, TV and radio. Would we do it over? Probably, but give us time to catch our breath from this one, OK? RF

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RS12M	$84.00	RS20M	$110.00
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CIRCLE 91 ON READER SERVICE CARD

upgrade don't stop now

by Gordon West WB6NOA

CW Practice on a Shoestring

Learning Morse code from scratch is one thing; increasing code speed skills is an altogether different matter. You may need to switch methods of code practice once you have your dots and dashes down pat.

There are a variety of ways to master the Morse code:

- Morse code classroom instruction
- Learning-code cassette tapes
- Computer software
- Code "boxes," like AEA and MFJ
- On-the-air monitoring

Morse code classes, taught by a local elmer, can be a lot of fun. You are not alone. It's a group effort to learn the sounds of the different dits and dahs, and form them into letters, and then words, and then sentences. It's a real team sport.

If you have a good, hot, excited elmer, all the better. The key to good code instruction is a code elmer who makes the code learning process FUN. Shop around the different clubs until you find the code class with the spirit of enthusiasm that will help you through those short sounds and long sounds!

Helpful Equipment

Code tapes, computer programs, and little code black boxes are fine when used with regular "in-person" code instruction. If there is not a code class near you, you may need to use this equipment as your primary code-learning source. Choose whichever system you like best, and if you really want to do it right, bring them all into your shack. A set of six code-learning tapes runs about $40. A code-learning computer program for your PC or Mac might cost $20. The AEA "Morse Machine" will run a little over $200, but this device can get you all the way up to Extra class, too. Whatever it takes, buy it, and start working with your dits and dahs 20 minutes in the morning, 20 minutes in the evening, and every now and then throw in a 20-minute afternoon session.

Whatever method you use to learn the code, work it to its fullest. If the computer has a program that lets you type in what is being heard, try it! If your little black box allows you to generate your own CW message on a straight key or a paddle, go out and get that straight key or paddle and try it just for fun. The more you can get involved with your code practice, the faster you are going to learn CW.

But don't get locked into the same old tape, or the same old CW program that you probably have memorized. Push yourself for new and innovative ways to pass that entry-level 5 wpm code test. Take the test, pass it, and then get set for some real fun!

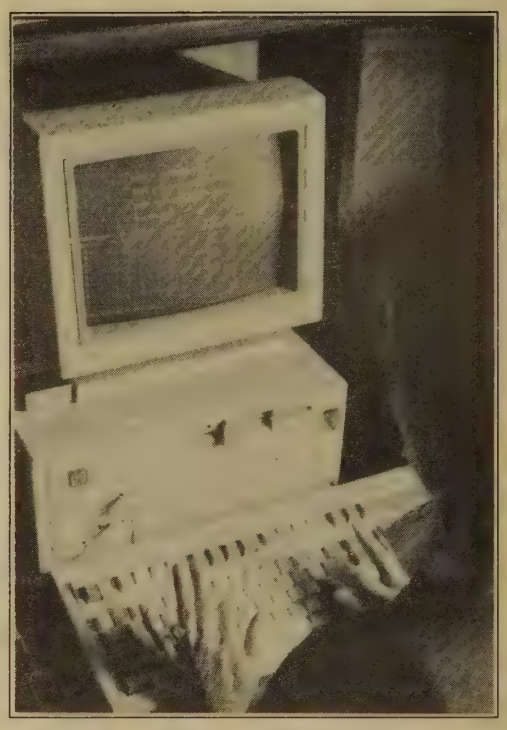

Photo C. A CW learning program for your computer is a fun way to learn the code and build up speed.

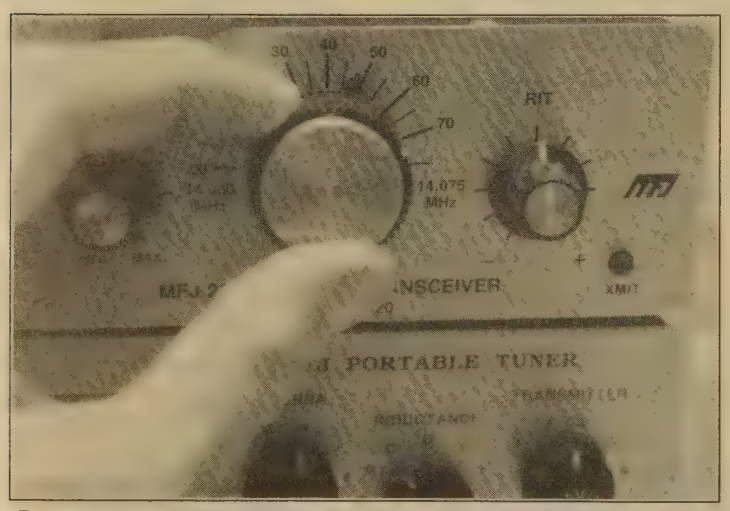

Photo A. An HF receiver such as this 20 meter model from MFJ is great for pulling in live Morse code conversations.

Photo B. This code learning machine from AEA can help you get your code speed all the way up to 20 words per minute.

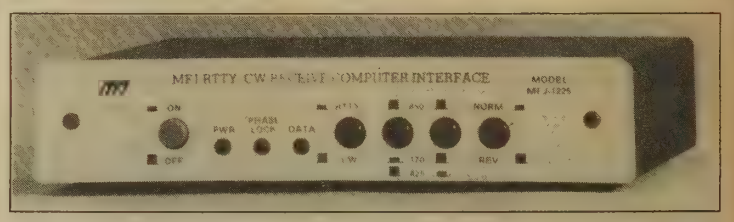

Photo D. This interface from MFJ allows you to copy code from the airwaves with your computer.

Increasing your Speed

Once you have the code completely learned, it's time to build your speed. More code tapes will help confirm your progress. Computer programs will help you build speed. So will the interactive black box "Morse Machine" from AEA. These speed-building devices are good . . . BUT NOTHING BEATS A CHEAP RECEIVER!

Any kind of shortwave radio might work. This includes those inexpensive little portable shortwave sets, too. As long as it has a VFO switch or a CW position, you will be able to capture the thousands of CW broadcasts between 2 MHz and 25 MHz.

On the high frequency spectrum, there are Morse code transmissions all over the place (plus those on ham frequencies, too):

- 10 wpm marine public coast station calls
- 15 wpm Coast Guard weather reports
- 5 wpm Novice-band code practice
- 20 wpm high-speed ham CW calls
- 13 wpm Air Force CW messages

There is no shortage of code practice anywhere on the dial. For best results, day or night, search between 10 MHz and 15 MHz for hundreds and thousands of CW signals. They can be picked up with any modest longwire antenna system.

Once you tune in a CW broadcast, write down every letter that you can catch. If you miss a letter, or they send a military-type procedural sign, just put a little dash on your paper. Try and decode everything you hear. You could even tape-record it and play the tape back several times to pick up any missing letters.

Some CW transmissions may come out as alphabet soup; others will make clear sense. But you won't know ahead of time what's coming down the earphones or speaker, AND THIS IS GOOD. Since you can't anticipate what's coming over the radio, it will be the next closest thing to sitting for your actual 5 wpm, 13 wpm, or 20 wpm VE examination. It sure beats practicing materials that you have worked to death and have subconsciously memorized. If it's straight off the air, who knows what's next!

But make sure your high frequency receiver has VFO or CW. If it doesn't, you won't be able to produce a beat tone on the continuous wave signal. Don't worry about the frequency readout. Who cares? Even if the code isn't coming in clear, it will still be a challenge to copy. Push yourself faster and faster, picking out a letter here and there.

It will probably be a big surprise when you go back to the code tapes to check your code-copy speed. Wow, you're at 15 wpm, no sweat. Sounds like it's time to take that General 13 wpm test. So get a receiver, and start copying. RF

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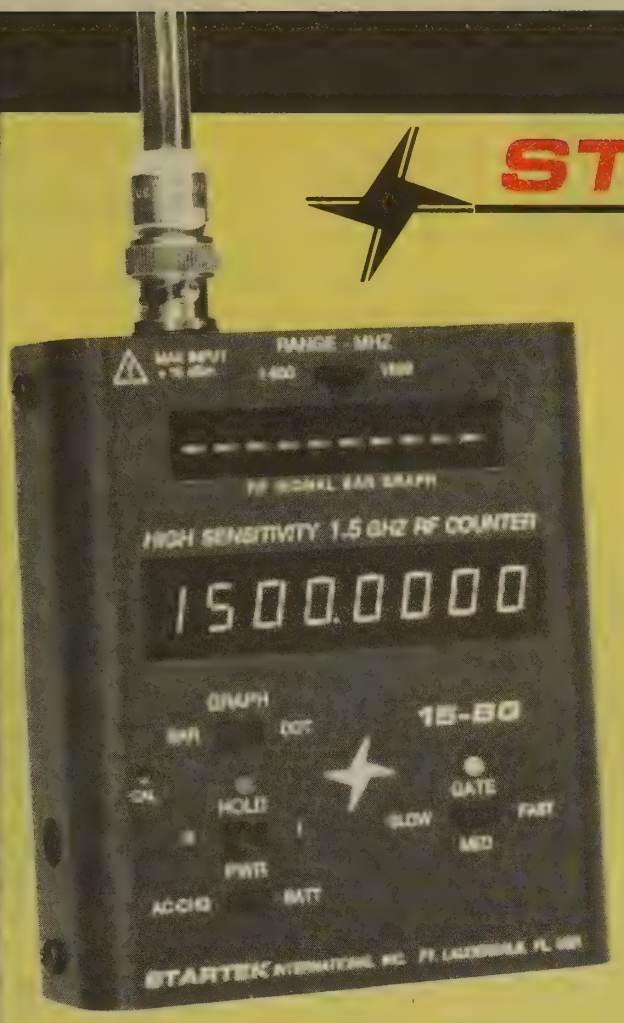

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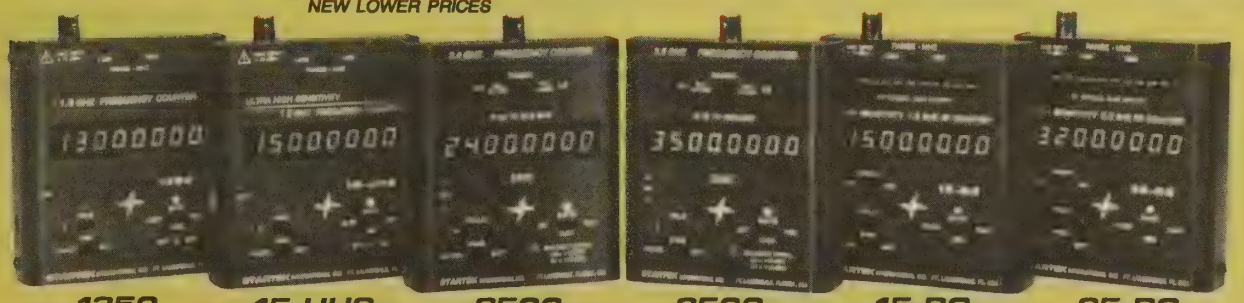

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CIRCLE 247 ON READER SERVICE CARD

RF vintage review

The Drake MN-2000

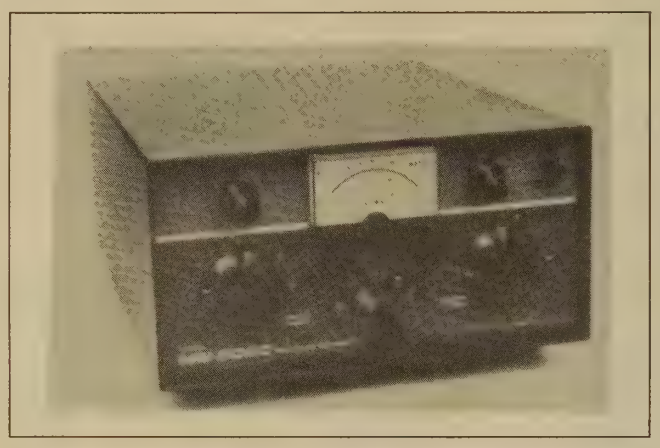
by Warren Elly WA1GUD

When you need an antenna tuner, consider the Drake MN-2000. This is a high-power matching network, capable of handling well in excess of the legal limit. The silver-plated switch contacts and tank coil are the first clue, along with the spacing of the MN-2000's nearly foot-long tuning capacitors.

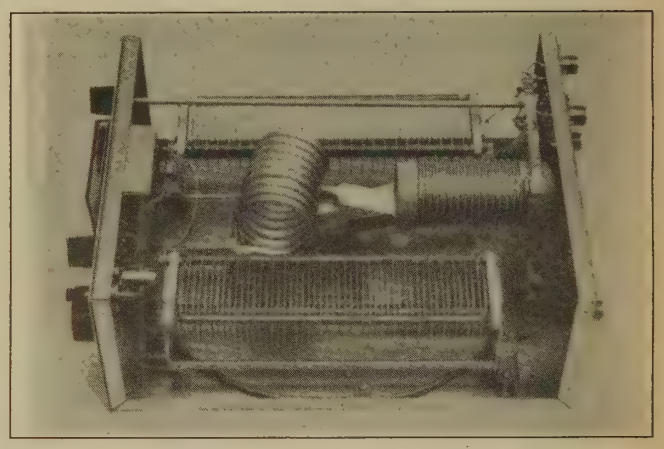
Drake's tuners (both the 2000- and 200-watt models) are double-shielded, with the typical Drake copper-colored chassis and black cabinet. SO-239 coax connectors are used throughout, with a ground post the only other rear panel connection.

The MN-2000 has been around for years, and the original design has held up well. Coverage is 80 through 10 meters, with an insertion loss of less than half a dB. The Drake took everything an SB-200, Henry 2K, and Alpha 374 could offer . . . willingly. Even faced with extremely bad mismatches, the MN-2000 tuned easily, and without the confusing series of dips usually associated with transmatches.

The Drake is really several station accessories in one—aside from being an antenna tuner, the MN-2000 serves as a wattmeter (comparing most favorably accuracy-wise with a Bird unit), SWR bridge, and antenna switch. A large, well-calibrated multimeter dominates the front panel, with wattmeter and SWR controls right, and antenna switching for three antennas left.



The Drake MN-2000 2 kW matching network. Note antenna switching left, power meter SWR controls right.



The MN-2000 with two layers of shielding removed. Silver-plated coils and SWR-power meter PC board are clearly visible.

A unique feature on the Drake is its ability to completely take the tuner out of the line, while maintaining wattmeter and SWR functions. Two antennas can be switched in this way, with the third antenna switching position wired straight through (excellent for a dummy load).

The MN-2000 is a component of the Drake system and, like the rest of the Drake line, its layout is classic. (Those of you who didn't go through junior high dreaming about girls and Drake lines really don't know what you missed!)

The matching network is larger than the companion R4C and T4XC transmitter and receiver series, but not big enough to present a problem in most shacks. The controls are well laid out, with a solid feel (the bandswitch leaves no doubt when it's engaged), and the tuning controls are large and operate smoothly.

Although designed for coax cable, the MN-2000 can handle open wire feeders with the use of a balun, and it worked fine with random wire antennas as well. The network is fairly broadbanded once tuned, allowing you to go as much as 100 kHz without touch-up. Tune-up can be a really quick procedure—if you take the time to tune each band and antenna, and draw up a chart plotting proper adjustment of the resistive and reactive tuning controls. The MN-2000's SWR bridge uses a minimum of switching, with a spring-loaded sensitivity control doubling as a switch for forward calibration. The wattmeter is broken down into two ranges (200 and 2000 watts) on the 3" by 2-1/2" meter scale.

Some other features of the MN-2000 include its ability to put 2nd harmonics down 25 to 35 dB (thus helping to reduce TVI problems). I checked Drake's claim on harmonic attenuation by tuning for the 2nd harmonic on my station receiver (a Drake R4B), and sure enough, the S-meter indicated Drake's specs were accurate. Another nice feature is the fact that using the MN-2000, there is no need to retune the exciter when driving a linear amplifier, since the tuner shows a pure 50-ohm load.

The Drake MN-2000 originally sold at a suggested retail of $220. RF

Reprinted from the March 1977 issue of 73 Amateur Radio.

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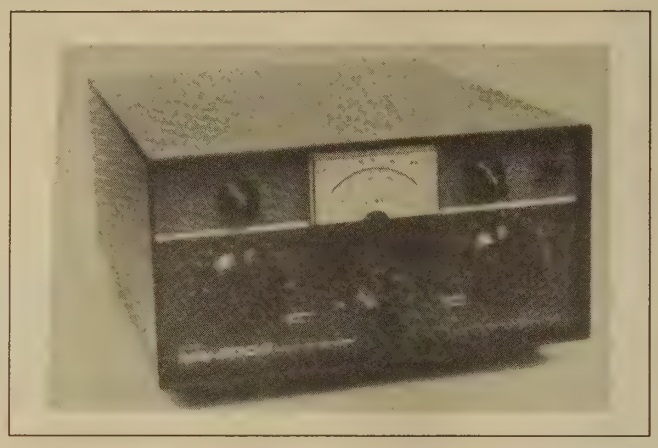

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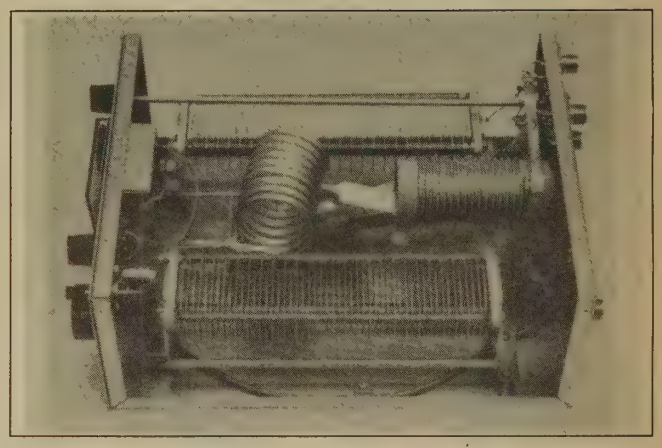

The MN-2000 with two layers of shielding removed. Silver-plated coils and SWR-power meter PC board are clearly visible.

A unique feature on the Drake is its ability to completely take the tuner out of the line, while maintaining wattmeter and SWR functions. Two antennas can be switched in this way, with the third antenna switching position wired straight through (excellent for a dummy load).

The MN-2000 is a component of the Drake system and, like the rest of the Drake line, its layout is classic. (Those of you who didn't go through junior high dreaming about girls and Drake lines really don't know what you missed!)

The matching network is larger than the companion R4C and T4XC transmitter and receiver series, but not big enough to present a problem in most shacks. The controls are well laid out, with a solid feel (the bandswitch leaves no doubt when it's engaged), and the tuning controls are large and operate smoothly.

Although designed for coax cable, the MN-2000 can handle open wire feeders with the use of a balun, and it worked fine with random wire antennas as well. The network is fairly broadbanded once tuned, allowing you to go as much as 100 kHz without touch-up. Tune-up can be a really quick procedure—if you take the time to tune each band and antenna, and draw up a chart plotting proper adjustment of the resistive and reactive tuning controls. The MN-2000's SWR bridge uses a minimum of switching, with a spring-loaded sensitivity control doubling as a switch for forward calibration. The wattmeter is broken down into two ranges (200 and 2000 watts) on the 3" by 2-1/2" meter scale.

Some other features of the MN-2000 include its ability to put 2nd harmonics down 25 to 35 dB (thus helping to reduce TVI problems). I checked Drake's claim on harmonic attenuation by tuning for the 2nd harmonic on my station receiver (a Drake R4B), and sure enough, the S-meter indicated Drake's specs were accurate. Another nice feature is the fact that using the MN-2000, there is no need to retune the exciter when driving a linear amplifier, since the tuner shows a pure 50-ohm load.

The Drake MN-2000 originally sold at a suggested retail of $220. RF

Reprinted from the March 1977 issue of 73 Amateur Radio.

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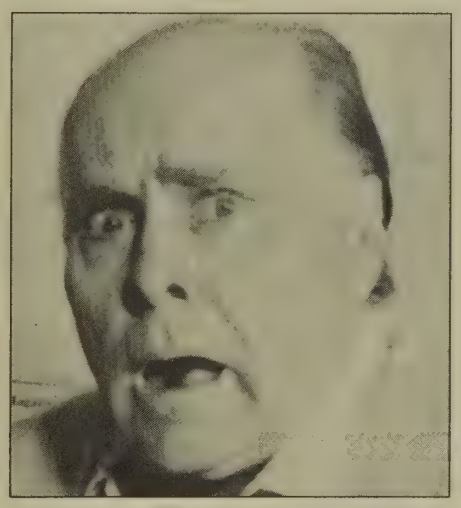

Our founder, Wayne Green W2NSD, upon hearing that you were not yet subscribing to *Radio Fun*.

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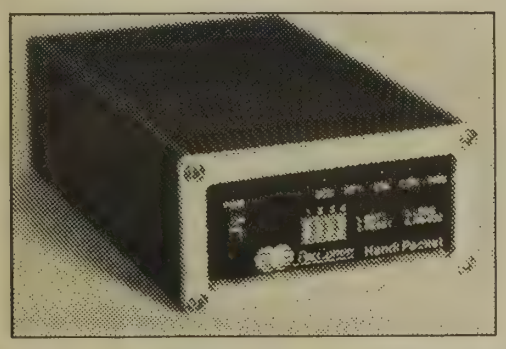

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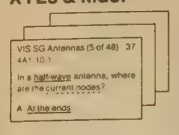

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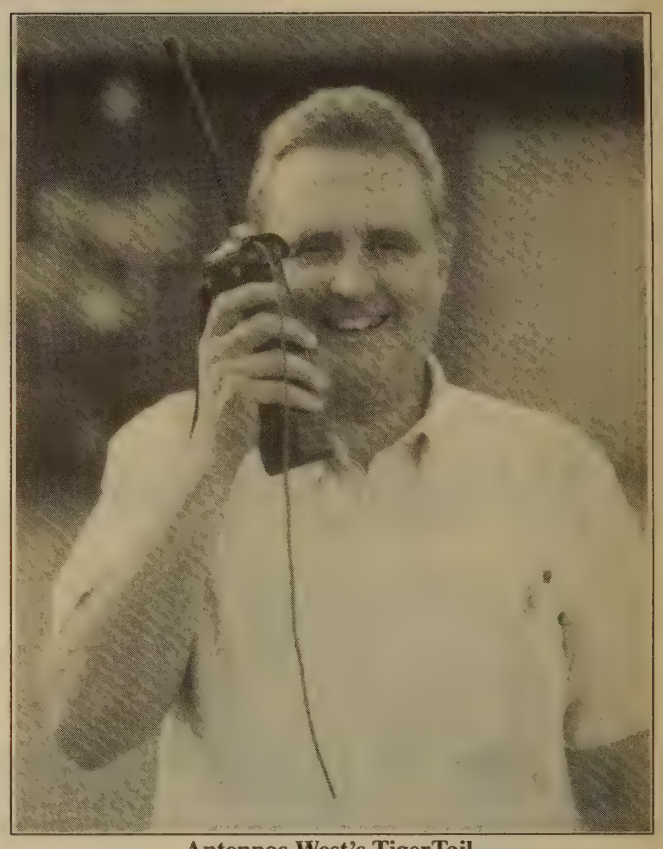


Antennas West's TigerTail.

On the way back through Utah on a ham-radio related "vacation," I happened to stop in Provo, Utah, to see an old friend, Jim Stevens KK7C. In the course of our first-ever eyeball QSO, with many fine topics covered and buried, we just happened upon the 2 meter hand-held radio "problem": How in the heck can you improve the coverage of one of these critters without resorting to using a large antenna with gain? Well, it turns out that Jim Stevens of Antennas West has a solution . . . and thereby hangs a tail, er, tale.

The Solution

Jim introduced me to a new product that he developed to fill the very need and solve the very problem I brought up: his TigerTail antenna accessory. To properly introduce the subject, we should consider that the REAL problem with a 2 meter hand-held is low power and a poor antenna. You can increase your power with a "brick" or amplifier, but that's expensive and sort of violates the principle of a small hand-held portable. By the same token, you can connect an external antenna, but those aren't usually convenient or available. So, what's the convenient and inexpensive solution to the antenna problem? Simple: a TigerTail. No, I am NOT running you around in circles . . . and there is a point to the tail, er, tale.

A hand-held radio clutched in your paw and coupled capacitively to your body makes a *very poor ground* system for your quarter-wave (at best) whip to work against, so the antenna efficiency is very poor.

Antennas West furnishes you with that missing half of the antenna: a missing half of your system that converts your quarter-wave whip to a half-wave dipole! You might also look at it as a single "radial" for a whip, hanging vertically from the base of your antenna . . . and they call it their TigerTail because it transforms your hand-held pussycat into a full-grown raging tiger . . . or at least the electronic facsimile thereof.

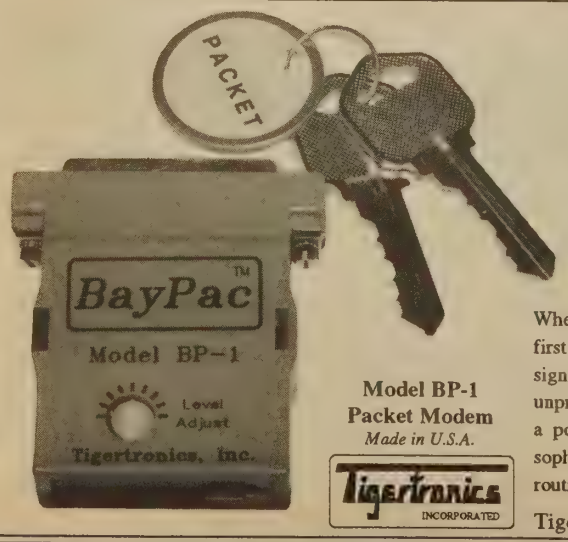
The Antennas West TigerTail is an "extender" that snaps onto any hand-held transceiver and boosts your transmitted signal as well as the received signal. It's unobtrusive, can be coiled up and stuck in your pocket, and weighs only a third of an ounce!

How can you prove to yourself that it works? Well, I read the very simple directions and tried it out myself in several locations during our vacation trip.

First, you set your handheld to the repeater with the weakest signal and key it up, then measure the signal strength (by ear or meter). Next, remove your "rubber ducky" flex antenna, whip, or 5/8-wave antenna temporarily and slip the TigerTail over the antenna connector (it has those two little notches in its connector ring to fit over the BNC tabs), then replace the antenna. Now, key up the repeater again and see and hear the difference!

How does it work? Simple: *without* the TigerTail, the ground bus on your transceiver circuit board is too small and your body is too lossy a radiator for the antenna to work against. But *with* the TigerTail, the antenna efficiency is increased (or "jumps," since we're talking of tigers here), and your signal is radiated low to the horizon instead of up into the clouds.

My own little 300 mW-output Kenwood hand-held transceiver won't, in many cases, "key up" several repeaters in our area; and if it does, they are "scratchy" and poor copy, coming and going. With the TigerTail it keys them up with full quieting in most cases, and is easy copy for the ham at the other end. I used it throughout the rest of our trip, and was able to verify how well it worked on numerous occasions. How can you lose for $7.95? RF



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what next

by Carole Perry WB2MGP

Another Middle School on the Air

During my educational forum at the Dayton Hamvention in 1990, I had the pleasure of meeting with several teachers from all across the country who were considering setting up a ham radio class in their schools. Now that it's two years later, I wonder how many of them were able to get a program off the ground. Fortunately, some of them stayed in touch with me and have become regular check-ins on our CQ All Schools net every Tuesday and Thursday at 16:30 UTC on 28.303 MHz. One teacher who I have had several follow-up conversations with is Jim Forest KB1YZ.

Jim is a teacher at the Leonardtown Middle School, 47 air miles southeast of Washington, D.C., located in the county seat of St. Mary's County—Leonardtown, Maryland, close to the Potomac River's shores. Jim is a technology education teacher who is using the "Introduction to Amateur Radio" curriculum package to teach sixth, seventh and eighth graders, along with his department chairman, Drew Dowdell. Mr. Dowdell, who is not yet a ham, acknowledges the benefits students gain through amateur radio.

As with most school radio programs across the country, Jim's classes are supported in part by local hams and radio clubs in the area. It's one of the very valuable resources that many teachers have come to rely on. Gary Sacks WA3BOP is the assistant principal and, along with Jim, is a member of St. Mary's County Amateur Radio Association (SMCARA). The club, with 80 plus members, is fully supportive of the needs of Leonardtown Middle School and has recently donated an all-HF-band antenna.

Jim tells me that after attending my forum he was determined to teach amateur radio to his middle school students. His principal, George Kirby, along with Drew Dowdell, listened to Jim's proposal to set up a radio station to teach ham radio classes in the industrial arts/technology department at school. They decided to first offer the classes to eighth graders during the second half of an 18-week semester. Near the end of the first half semester, the new course, "Communications With Amateur Radio" was introduced and students were given the option to choose either woodworking or ham radio. The outcome was an even split of children choosing each course. This lead to the formation of two amateur radio classes which began in mid-November that year.

A Helpful Neighbor

Jim's first order of business was to find a way to support the club-donated HF antenna. A site survey determined that one end of the folded dipole could be tied to an existing roof-mounted tower used for the school TV and FM radio antennas. A second sky hook was needed to finish the job. Another ham teacher to the rescue! Next door to Leonardtown Middle School is the St. Mary's County Technical Center where Chuck Gantz K3WJX works in student placement. Jim visited Chuck, a member of the SMCARA, seeking ideas on supporting the end of the wire antenna on his school's flat, barren roof.

Chuck generously donated two 20-foot sections of a tower he had thoughtfully stashed in his garage. He then transported the tower to the Tech Center and enlisted the help of the students in the welding class to manufacture base plates and brackets for the middle school's tilt-over tower.

Other hams who helped out were Warren KW3N, Steve KD3UF, and Pete WA3UMY, who donated time and equipment in support of the school. The students now use an HR-2510 (donated by Uniden through the NARA organization) and a Kenwood 830 into a 90-foot 80-through-10-meter folded dipole antenna. The students have participated in both local and DX contacts, which are mostly European due to their early morning class periods.

At the end of the first week, the students were visited by author Richard Skolnik KB4LCS, who recently had his book, especially for kids, *The Wonderful World of Ham Radio* published. Jim met Richard at the ARRL East Coast Educational Workshop. Mr. Skolnik's talk and demonstrations inspired the students to become interested in many aspects of amateur radio. Jim agrees with me that bringing interesting and enthusiastic guest speakers into the classroom is a wonderful way to stimulate the students.

Jim also recalled for me that one of the most memorable contacts the class made was to a trapper named Bob who was 400 miles north of Fairbanks, Alaska, in a cabin where he was trying to keep warm in temperatures of -40 degrees Fahrenheit (with the wind chill factor). We both laughed as Jim relayed to me that the first question the children came up with was, "What color is your long underwear?"

Besides having on-the-air operating experiences, students are now working hard learning basic radio theory, rules and regulations, and the code. Jim and the SMCARA club members hope that the course will motivate many of the students to become ham radio operators and enjoy this fascinating hobby.

Photo A. Ham instructor Jim Forest KB1YZ and LMS eighth-grade students using an HW-101 to find stations to talk with.

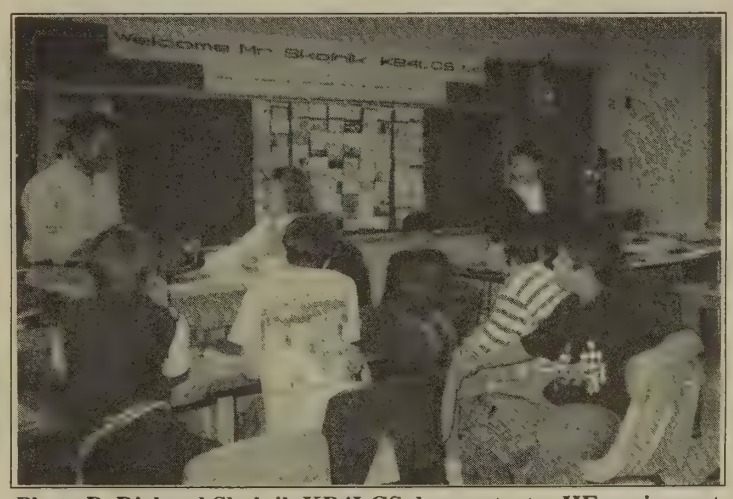

Photo B. Richard Skolnik KB4LCS demonstrates HF equipment to LMS students. Eighth-grader Shana Decker is at the rig with Richard.

Since the program began, four children have gotten their Novice licenses and plan to upgrade. The students have also participated in Field Day. Jim has two classes a term with 20 students in each class. The goal of the program is to relate learning about communications with ham radio. This coming term he plans to get started with packet radio and to teach electronic drafting as it relates to communications.

When I asked if Jim has approached other teachers to work with him in an inter-disciplinary approach to teaching, he told me that he'll be working with the language arts teacher to help the children write their packet messages and with pen pal letters from contacts they've made on the air. The science teacher at Jim's school is excited about sharing a unit on space travel and communications with Jim.

If you are a teacher who is looking for some good ideas about introducing an interdisciplinary approach to the teaching of your ham radio program, please call or write to me so we can share our best ideas. I can be reached at (718) 983-1416, or at P.O. Box 131646, Staten Island NY 10313-0006.

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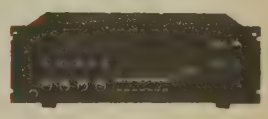
LIST
IC-781 Deluxe HF w/scope 6523.00 Call $
IC-765 Ge. Cvg Xcvr 2856.00 Call $
IC-735 Gen. Cvg Xcvr [illegible] Call $
IC-728 New Transceiver 109[illegible] Call $
IC-729 New Transceiver [illegible] Call $
IC-R7000 [illegible] Call $
IC-71A 10[illegible] Call $
IC-[illegible] Call $
IC-47[illegible] Call $
IC-24[illegible] Call $
IC-32[illegible] Call $
IC-22[illegible] Call $
IC-229H [illegible] Call $
IC-228H 2m [illegible] Call $
IC-W2A 2m[illegible] Call $
IC-24AT 2m [illegible] Call $
IC-2SAT 2m [illegible] Call $
IC-P2AT New 2m FM 2w w/TTP 412.00 Call $
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CIRCLE 153 ON READER SERVICE CAR

Joe Carr K4IPV

antennas, etc.

by Joseph J. Carr K4IPV

A New Column for *Radio Fun!*

Permit me to introduce myself: I am your new *Radio Fun* columnist. The name is Joe Carr, and the callsign is K4IPV. I've been in ham radio since 1959 and was an SWL before that. I am a professional electronic engineer (but had 16 years of electronic technician experience first), and have written more than 80 books and 450 articles . . . mostly on radio and electronics. My address is: P.O. Box 1099, Falls Church VA 22041; your comments and suggestions are always welcomed. Heck, even your criticisms and brickbats are welcomed because I believe that each valid complaint contains within it the seeds of wisdom that lead to continuous improvement.

The main thrust of this column will be ham radio antennas, of which I've built more than a few, and antenna-related accessories. We will be taking a look at some interesting designs, construction techniques, safety, using, tuning, messing with, and on and on and on. Sometimes we'll take a look at commercial antennas and antenna-related products. Some people may want to check out my two antenna books: *Practical Antenna Handbook* (TAB/McGraw-Hill, cat. no. 3270; Blue Ridge Summit PA 17294; 1-800-233-1128) and *Receiving Antenna Handbook* (High-Text Publications, 7128 Miramar Road, Suite 15, San Diego CA 92121; 619-693-5900). You'll find both of them useful, I'm sure.

Occasionally, as the need arises, we may divert from the strict antenna topics and delve into areas—mostly from reader questions or suggestions—that interest large numbers of people. Nothing esoteric, mind you, but good solid practical stuff.

Getting Wire Antennas To Stay Up

My Novice days were exciting and, egged on by two mentors ("Mac" Parker W4II and Hugh Collins, a Voice of America engineer), I eagerly set out to get on the air as quickly as possible. A brand-newly assembled Heathkit DX-35 transmitter did wonders lighting up a 100-watt light bulb pseudo-dummy load before my FCC license arrived, but when the BIG DAY finally came that warm June in 1959 I was short a real antenna. The 20 feet of bell wire strung around my second floor bedroom worked reasonably well for the borrowed BC-342 receiver, but wouldn't work worth squat on the transmitter (even with an antenna tuner). So I rapidly put up a half-wavelength 40 meter dipole . . . strung rather too tautly between a short tree and a guardrail around the roof of our porch. Not pretty, but it did get out reasonably well on both 40m and 15m. At least for a while. A wicked wind that October wrenched it loose, whipped it around and generally made a shambles of my handiwork.

Back to the drawing board. Or, more correctly, back to my mentors: The tree where the antenna was anchored belonged to Hugh Collins. Surveying the tangled copper wire and coax, he smiled that kindly, knowing, thin-lipped little smile of them what knew all along but wanted you to learn for yourself, and told me: "Wrong kind of wire . . . put up wrong too." Darn!

So what were my errors? Several, many and manifold, I might say now (but not too serious for a dumb kid). The "wrong wire" was ordinary bell wire (i.e. a hardware store wire for door bells that looks about like #22 solid hook-up wire). The correct material, for best reliability, is #14 AWG Copperweld wire. This special antenna wire is stranded, and each strand consists of a steel core that is coated with a layer of copper. Because of the "skin effect," radio frequency currents flow only on the surface of the round conductor, so no real harm is done by the high resistance steel core, yet the steel wire is strong enough to sustain a lot of load from winds and rain and snow. If Copperweld is not available, then hard-drawn #14 stranded copper wire is next best.

Another of my youthful mistakes was the manner in which the wire was secured to the center insulator and end insulators. Figure 1 shows the correct method for fastening the wire to the insulator. The conductor is looped through the hole in the insulator, wrapped around itself about seven times, and then coated with solder. The solder does NOT add strength, but prevents oxidation (so is especially important at the center insulator where the coax is attached).

Some people also recommend using a coating of white grease or RTV, or silicone seal, or some similar product, in order to keep down corrosion. Regardless, it is a good idea to lower the antenna once a year or so and inspect, and possibly redo, the electrical connections. Examine the coax for evidence of water intrusion, and examine the entire length of the antenna wire for evidence of fraying or other trauma. A point to pay special attention to is the area in the first couple of inches from each end. These areas tend to take a bit of stress, and often show early signs of failure in the form of broken strands or fraying. Points where the wire has kinked and then been straightened out should also be inspected closely (actually, kinked wire should not have been used in the first place, the purist would say).

Another factor in the longevity of wire antennas is the matter of strain relief. My little tree (well, Hugh's tree) tended to whip about in strong winds, and that meant the antenna wire alternatively drooped and then jerked taut . . . until it snapped. Antenna theory would suggest that a perfectly taut, but not strained, completely horizontal dipole is absolutely the best performer. However, not only is it very difficult (maybe impossible) to achieve that textbook ideal, that slight droop in the center adds a little length that can be taken up when the tree whips around.

One older ham I recall from those Novice days had a beautiful 80 meter double-extended zepp strung between two hundred-foot towers (which our county government probably wouldn't even allow today), and fed with parallel open-wire transmission line (a real classical ham antenna, right out of a pre-World War II *ARRL Handbook*). He had bad luck in the past with pulleys, so he used a brass "horseshoe" assembly (Figure 2) at the top of the towers to permit him to raise and lower the wire. At the bottom of one end of the system he had a counterweight that was just sufficient to keep the wire slightly taut. When the wind or snow loaded the wire and caused it to droop, the counterweight would raise by the same amount. That counterweight was a real gem: a one-gallon galvanized steel bucket filled with enough rocks to balance the weight of the antenna. He had drilled holes in the bottom of the bucket to permit rain water to run out.

The secret to keeping the antenna up in the air, and you on the air, is to use good materials, good practices and a little practical "horse sense" about how it is constructed. Good luck, and work safe. RF

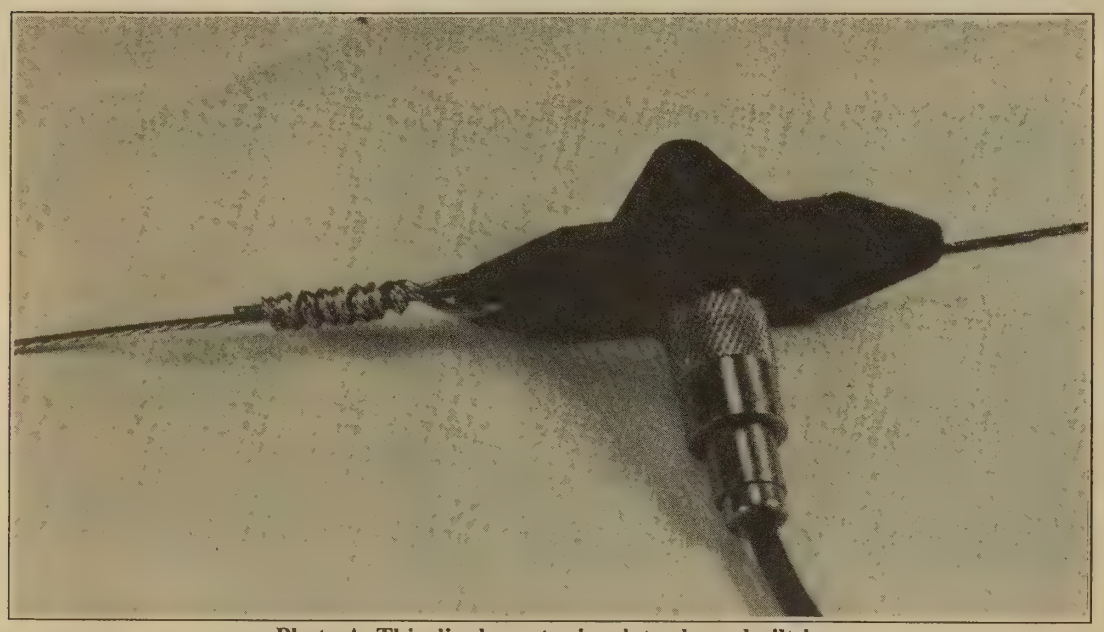

Photo A. This dipole center insulator has a built-in SO-239 coax connector.

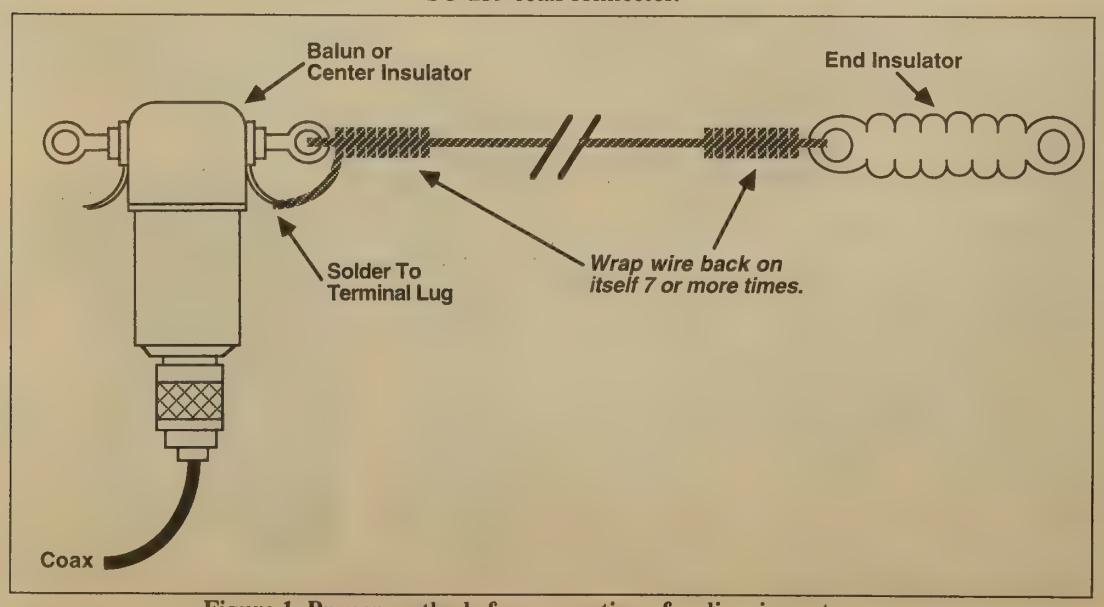

Figure 1. Proper methods for connection of radio wire antennas.

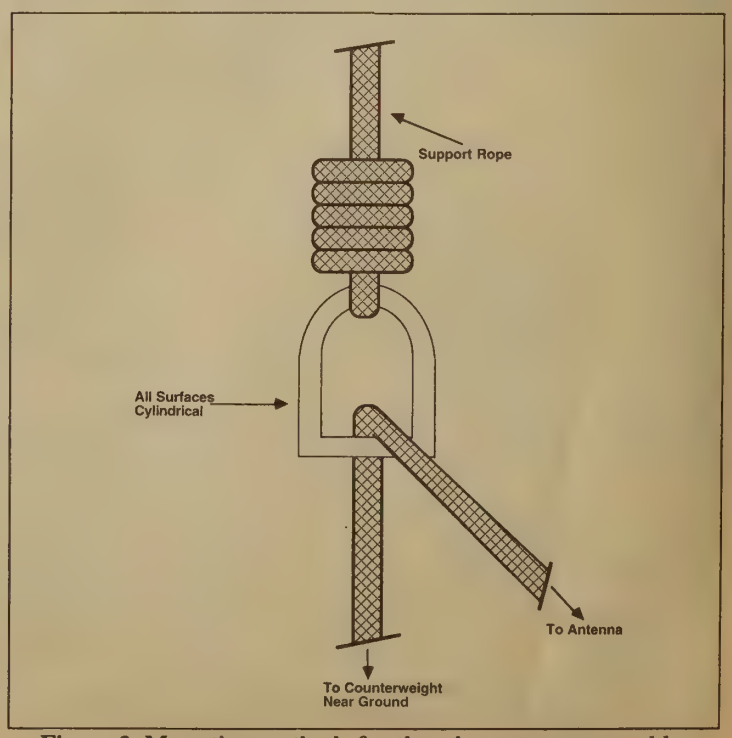

Figure 2. Mounting methods for the wire antenna assembly.

Daniel Huettner, Biglerville PA
Your *Radio Fun* tabloid is fun to read.

I'm an entrepreneur and run Page Graphics, a free-lance graphic arts shop that specializes in page mechanicals. I am not yet a ham, but I collect old and antique radios, most of which have shortwave on them, so I guess I am an SWL. The most exciting listen we've had here was the night Gorbachev was taken captive at his winter home last year. We were watching a movie on TV and the news broke in with a bulletin that Gorby was resting peacefully in his winter residence and there was no cause for alarm. Right!!! My wife, son and I looked at each other and all in unison said, "To the basement!" We ran down and fired up two radios, one to radio Moscow, the other to the BBC World Service. With a third we roamed the dial. Europe and the BBC were in a state of panic; however, Radio Moscow was playing an easy-listening version of "We'll meet again, don't know where, don't know when." Next they had their news, which confirmed the coup and that Gorby was being held in house arrest. Then suddenly Radio Moscow's volume decreased and they were gone!

So in one night my radio-collecting hobby had won legitimacy with the family!

I have begun reading up on amateur radio because sooner or later I will run across a vintage transmitter to add to my collection, and I now know that I must obtain a license to run the darned thing. This ties my hobby in with amateur radio: I get old radios, fix them up and see if they play; hams, I take it, build a great deal of their own equipment, then test it and see how it works. This alone interests me in that I am now mainly listening with a Hallicrafters S-40B with CW capabilities. I get fair results picking up SW broadcasting with my homemade helical bird cage antenna hung in the cellar stairwell, but the amateur bands are mostly silent. With all this overcrowding I'm reading about, I must be doing something wrong. I believe I must build some frequency-specific antennas, and I can't wait.

This leads to a question: Where do all you guys pick up this different-sized aluminum tubing? The local Radio Shack store doesn't have a ham section. The local hardware store has only wide-eyed stares . . . aluminum? Yet the articles about antenna construction all prescribe aluminum tubing. Help! I'm interested in building a yagi or a quad so I can listen in on all the significant gab.

As in any hobby, there are purists and they must be endured. For instance, in my hobby, some collectors are so fussy that if they have a Sylvania table radio, it must have all Sylvania tubes and parts. I'm just glad the old thing puts out audio, even if it's only on one station from down the road! One of the most beautiful pieces on my living room bookshelf is just that way. When anyone asks if it plays, I snap the switch and there it is—AM, loud and clear (only seven miles away, but who cares—to them I'm the genius who fixed it).

I sent for and built the Sudden receiver which was the cover story in the October 1991 issue of *73 Amateur Radio Today*. This makes a great project for the Boy Scout Radio Merit Badge.

Daniel—Thanks for the interesting story about your SWLing. With your experience fixing old radios, you should have no problems studying for a ham license.

You sure don't need a yagi to pick up the ham bands. Simple wire antennas work great. Most hams use single sideband. You're probably not hearing any hams because your old receivers receive AM/CW only. Those Donald Duck voices you're probably hearing are us hams!

Aluminum tubing is a common hardware store item. I'm surprised your local store doesn't stock it. —David N1GPH

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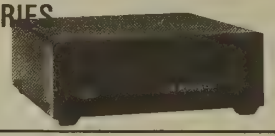

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• LOW PROFILE POWER SUPPLY						
SL-11A	•	•	7	11	2¾ x 7⅝ x 9¾	11

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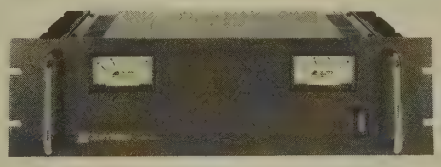
• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE				
RS-4L	3	4	3½ x 6⅛ x 7¼	6
RS-5L	4	5	3½ x 6⅛ x 7¼	7



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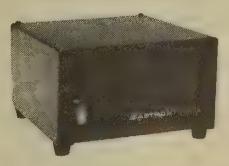
• 19" RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RM-12A	9	12	5¼ × 19 × 8¼	16
RM-35A	25	35	5¼ × 19 × 12½	38
RM-50A	37	50	5¼ × 19 × 12½	50
RM-60A	50	55	7 × 19 × 12½	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5¼ × 19 × 8¼	16
RM-35M	25	35	5¼ × 19 × 12½	38
RM-50M	37	50	5¼ × 19 × 12½	50
RM-60M	50	55	7 × 19 × 12½	60

RS-A SERIES



MODEL RS-7A

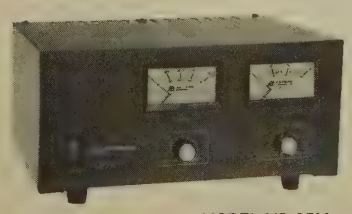
MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-3A		•	2.5	3	3 × 4¾ × 5¾	4
RS-4A	•	•	3	4	3¾ × 6½ × 9	5
RS-5A		•	4	5	3½ × 6⅛ × 7¼	7
RS-7A	•	•	5	7	3¾ × 6½ × 9	9
RS-7B	•	•	5	7	4 × 7½ × 10¾	10
RS-10A	•	•	7.5	10	4 × 7½ × 10¾	11
RS-12A	•	•	9	12	4½ × 8 × 9	13
RS-12B		•	9	12	4 × 7½ × 10¾	13
RS-20A	•	•	16	20	5 × 9 × 10½	18
RS-35A	•	•	25	35	5 × 11 × 11	27
RS-50A	•		37	50	6 × 13¾ × 11	46

RS-M SERIES

MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4½ × 8 × 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 × 9 × 10½	18
RS-35M	25	35	5 × 11 × 11	27
RS-50M	37	50	6 × 13¾ × 11	46

VS-M AND VRM-M SERIES



MODEL VS-35M

• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps) @13.8VDC	@10VDC	@5VDC	ICS* (Amps) @13.8V	Size (IN) H × W × D	Shipping Wt. (lbs.)
VS-12M	9	5	2	12	4½ × 8 × 9	13
VS-20M	16	9	4	20	5 × 9 × 10½	20
VS-35M	25	15	7	35	5 × 11 × 11	29
VS-50M	37	22	10	50	6 × 13¾ × 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5¼ × 19 × 12½	38
VRM-50M	37	22	10	50	5¼ × 19 × 12½	50

RS-S SERIES

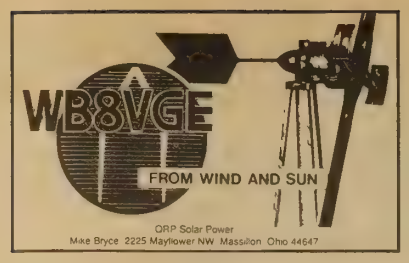
MODEL RS-12S

• Built in speaker

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* Amps	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-7S	•	•	5	7	4 × 7½ × 10¾	10
RS-10S	•	•	7.5	10	4 × 7½ × 10¾	12
RS-12S	•	•	9	12	4½ × 8 × 9	13
RS-20S	•	•	16	20	5 × 9 × 10½	18

*ICS—Intermittent Communication Service (50% Duty Cycle 5min. on 5 min. off)

CIRCLE 16 ON READER SERVICE CARD



radio magic

by Michael Bryce WB8VGE

Try an Invisibile Antenna

Not everyone wants to live next door to your antenna farm. Antenna restrictions vary from town to town, and between specific sites within a town. Many newer lots don't allow any outside antennas at all. This may even include TV and FM radio antennas. With so many different types of antenna restrictions, you may think all is lost when trying to put up an antenna. In many cases you'll be correct in thinking you're out of luck. However, let me show you some ideas that have worked. In some cases you'll need to modify these plans to suit your needs, but they will put you on the right track.

What Are Your Restrictions?

The first thing you have to do is find out if you're able to install an antenna. Make the request to the zoning board or whoever is in control of such things in your neighborhood. Don't just put an antenna up unless you know for sure there are no antenna restrictions. Most of the newer city lots restrict all outside antennas. Do you own your home or do you rent? Most landlords will not allow antennas. But there again, if you do rent, ask the landlord about installing a simple antenna. You might be surprised! If you own your home or condo, ask your housing committee for permission to install an antenna. When asking, be specific about what type of antenna, how high, how big, how ugly. Explain to the powers that be about the role hams play in emergency communications. Don't get too fancy, and don't talk over their heads. Unless they're hams, a DX contest means nothing to them. On the other hand, try not to talk down to them, either. No one wants to be made to look dumb.

If you're thinking about moving into an allotment, check for outside TV antennas. If you see some up, then more than likely you'll be able to install an antenna or two. On the other hand, if you see nothing up in the air, not even utility poles, then the odds are against you and your antenna. What to do? Well, you could look for a house in a different location! Ah yes, you'd be dead meat if you did that if your spouse has found the perfect house in an antenna-restricted location. Such is life.

There are two things to keep in mind when installing an invisible antenna: You have to keep it invisible and you have to keep it safe. In no way should someone be able to come in contact with the antenna. Even with only 100 watts of RF power you can get a nasty RF burn. I can't think of a quicker way to end up in court with a lawsuit against you than to cause harm to someone because of your neglect.

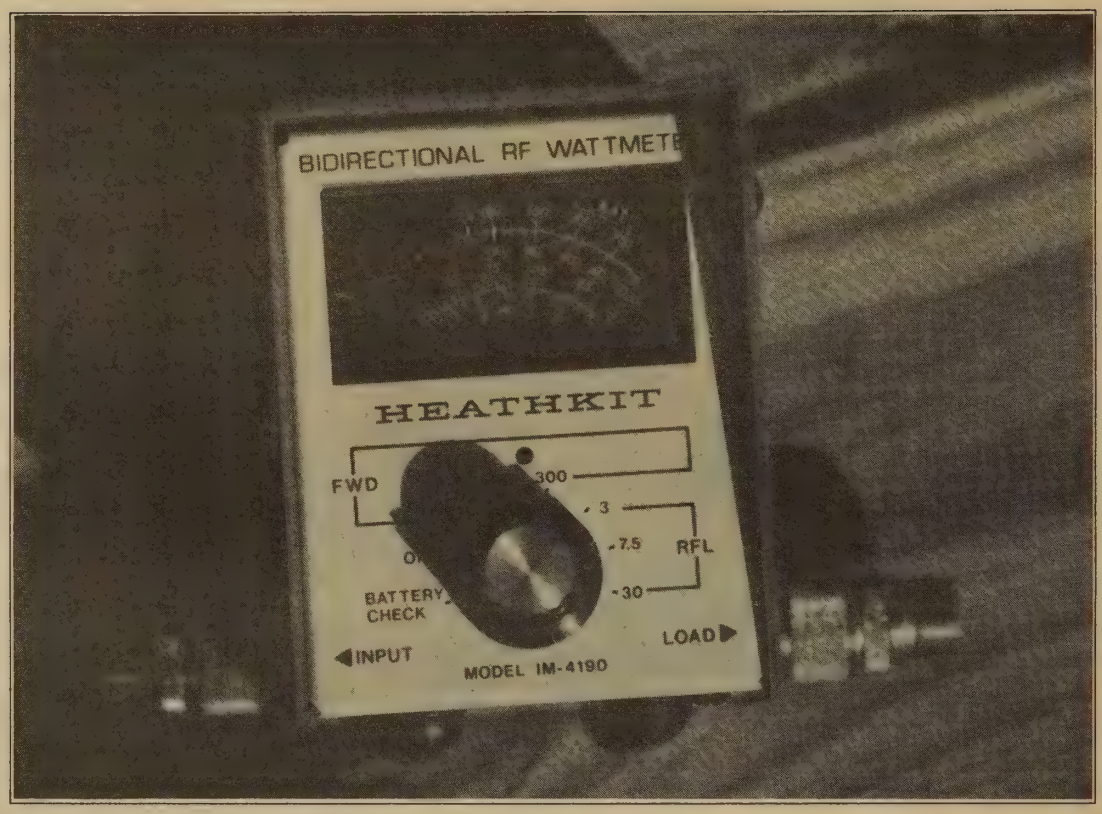


Photo A. An SWR/wattmeter will come in very handy for tuning up your antennas. I picked up this Heathkit unit at a flea market for $15. It's only good from 2 meters on up in frequency.

The Attic

Do you have access to the attic? This is the first spot to look when antenna building. Depending on the size of the attic, you may be able to install a small triband beam there. A rotor mounted between the rafters will turn the beam, provided you have enough room for the beam to turn. You can get away with a smaller rotor than usual, too, as you don't have to worry about wind loading in an attic. When turning the beam, the rotor may transmit noise (from the rotor itself) throughout the upper floors. This may not go over real well with the people living upstairs. I've seen some setups for turning the beam in an attic by using ropes and pulleys—the old arm-strong method.

If you don't have the space inside the attic for a beam, then how about a dipole? If you have the length, but not the width, a trapped dipole will work quite well in an attic.

Using Coax

Access to the attic assumes you either own the entire home or rent from the top floor. If you rent and live in the bottom level, a small run of coax may prove invaluable. Run the coax from the dipole in the attic through the soffit (the horizontal underside of an eave), down the spouting to your window. Run the coax on the backside of the spouting so it remains out of sight. Don't use the larger RG-8/U cable—although it's best for the radio and the antenna, it's also much harder to hide. Use the best quality RG-58/U you can get your hands on. Some of the "mini" RG/8U cable is the same size as the RG-58 but as good electrically as the RG-8/U cable.

Run the cable into your apartment via a ground floor window. Don't drill any holes in the window frame! There are specially made devices to let you run coax and twin lead through or underneath your window frame. If you can't get the coax into the apartment via a window, try the dryer vent, or places where other wires and cables enter the apartment. *But don't run your coax along electrical wires!* That's a violation of the National Electrical Code. It may sound like I'm in a rut on antenna safety, but you don't want to kill yourself or someone else.

Random Wire

So, if you can't get into the attic, and can't get a run of coax down the side of the apartment, what do you do? Well, you can use a random length wire to get on the air. They're much easier to hide than a dipole and you can get on several bands with a random wire and tuner combination. You'll need a small antenna tuner and a support to hold the wire. You can use a tree, a pole or another building. Don't use a utility pole! Also, avoid running the wire over play areas or over the parking lot in case the wire should break—you don't want to cause damage to cars or people. The wire will come down because you have to use very thin wire so it will blend into the sky.

Magnet wire works great if you can find a large spool of the stuff. Number 22 or 24 wire works quite well. Don't go much smaller in gauge size as the wire won't be able to support its own weight. You can't use regular antenna wire because it will be visible from the ground. Also, check for different colors of wire. A lighter color will blend in better than a darker one against the sky.

You'll need to run as long a length of wire as you can get, but you don't want to go too long as the weight of the wire will cause it to break. Try to keep your random wire under 60 feet when using magnet wire. Nylon cord works best in holding the antenna up at the ends. A nylon cable tie makes a good insulator for the wire ends.

Of course you'll need some type of antenna tuner to resonate the random wire antenna. You'll also need an RF ground. Your best bet here is the cold water pipes in the apartment. Some of the newer units use plastic pipe and of course that's not going to work. Whatever you do, don't use the gas line for your ground connection. If you can't get to a water pipe, the next best thing is a sewer pipe or bathroom vent pipe. Again, these won't work if they are made of plastic.

If no ground is available, then make up your own. You can run wires inside the apartment to make a counterpoise to work against the random wire antenna. You can also use one of the artificial grounds devices. MFJ makes a unit that works well and is reasonably priced.

You can try and run a small ground rod into the soil from a nearby window. You can snake a ground wire through the dryer vent to your ground rod. Of course it would be great to pound in a six-foot ground rod, but keep it simple and use only a three- or four-foot rod. Pound it all the way into the soil and for heaven's sake, keep the rod as close to the foundation of the apartment as you can. You don't want a child to fall on the stub sticking out of the soil.

Before we run out of space this month, one last item regarding safety. Don't plan on using an amplifier with a hidden antenna. When using a less-than-perfect antenna system, running high power will cause you all types of trouble. I'm sure there are those who run a kW and have no trouble with TVI, but why risk bringing the entire apartment complex down on your back?

Next month I'll show you some examples of indoor antennas for both the HF and the VHF bands. RF

updates

the tech side

Refer to the September 1992 column "The Tech Side." An editing error occurred in the section entitled "The Dangerous Part." The sentence reading, "This unisolated circuitry is *dead*." should read as, "This unisolated circuitry is *deadly*." RF

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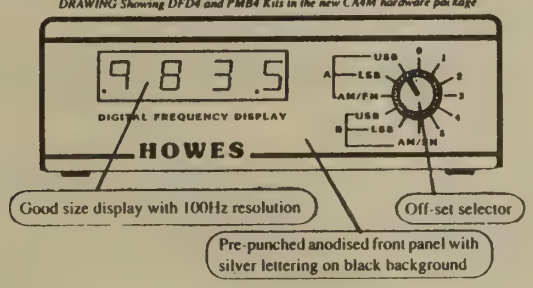
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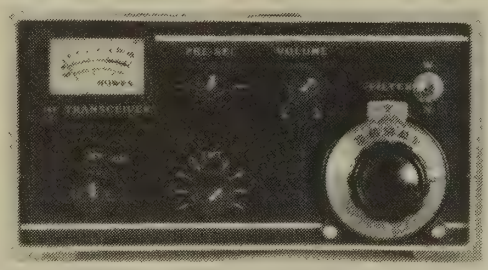

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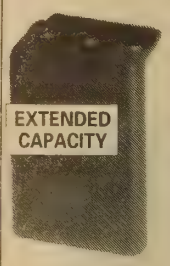

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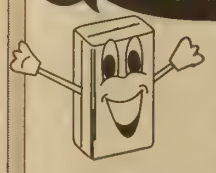

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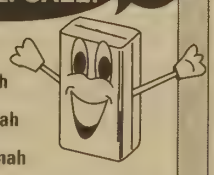

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CIRCLE 68 ON READER SERVICE CARD

computers in the shack

by Jeffrey Sloman N1EWO

Using a PBBS

A lot of your letters (thanks for writing) ask about using a PBBS. PBBS stands for Packet Bulletin Board System. It is very much like a telephone BBS, collecting messages from users and storing them for their intended recipients. PBBSs also forward messages—addressed to hams outside the local area—to their counterparts in closer to the messages' final destination. Forwarding can be a mysterious process, and it happens on just about every band where packet traffic is allowed. Messages get forwarded through satellites, over telephone lines, by HF (High Frequency) links, and on VHF—2 meters, for example. The message can be sent anywhere on the global packet network. All this equipment—literally millions of dollars worth—is available to you via your packet station.

Getting Started

The first thing you'll have to do is choose a PBBS as your "home" PBBS. If your area has only one PBBS, the choice is easy, but many of you will find several in your area. There are a couple of things to consider when selecting one of them. First, which has the best signal where you are? This is very important for reliable connections. One of the more frustrating things is losing your connection to a PBBS before getting a chance to list the new messages. This is because the PBBS software is not too smart, and once you connect it resets the pointer that tells it where new messages for you start. This means having to guess how many messages to list. (To understand this better, see the discussion on listing messages below).

The other thing to figure out is the sysop's intended service area for his/her PBBS. Sometimes connecting to the BBS will produce a message like Figure 1.

As you can see, N5AAA tells us right away where the PBBS is targeted. The other way the PBBS might give you this information is by using the **I** (Information) command. This command has more than one use, but **I** alone should produce a short informational message about the PBBS. If both of these approaches fail, try asking around on local repeaters about the various PBBSs. Someone—maybe even the sysop—will probably answer your questions. One thing to try to avoid is intentionally making a very distant or hard-to-hear PBBS your home. This will not only be unreliable, it is also likely to interfere with stations local to the PBBS trying to connect.

Generally, no one will ask you for money to use a PBBS, but once you find a home it is probably in your best interest to help out the sysop (SYStem OPerator), either financially—running a PBBS isn't free—or with your time. Let the sysop know you are willing to help with antennas, equipment, or—if you don't have any particular expertise to offer—holding things.

Moving In

Once you have chosen a home, you'll need to let the PBBS know you are moving in. The first time you connect to a new PBBS, it will prompt you to tell it about yourself. It will already know your call—that gets sent with the connect request. It will ask you for four pieces of information:

your name

This is your first name, which will be put in the database attached to your call. Use whatever name you normally use on the air.

your QTH (location)

This is your city and state. The PBBS doesn't actually understand this information, so type it in carefully—it won't check it for errors. The normal city, state format is fine. For example: Indianapolis, IN or Boston, MA.

your ZIP code

This is just your ZIP code. For example: 07726 or 90210.

your home BBS

This is where you tell the PBBS that you want to make your home here. It is just the call of the PBBS. For example: N5AAA or K1UGM. If you connect to a new PBBS for some reason, it may want this information, too. Be sure to type the call of the home PBBS you have chosen—not the one you happened to be connected to.

The commands for these operations may vary slightly from PBBS to PBBS. Fortunately, when the software doesn't recognize you, it will always prompt you for this information with instructions on entering it.

Reading the Mail

OK, so you've found a home and you are connected—now what? Well the first thing you will probably want to do is read some messages. You will find quite a few new public messages on the list each day; 50 is not unusual. To read messages you must know what their message number is. To find this out, use the L (List) command or one of its variants.

L (List)

This command will list all new messages since you last connected. Depending upon how many old messages the PBBS retains—this is up to the sysop—this can be hundreds of messages. If this is your first time connecting, you might want to try LL below. Most of the time, this will be the first thing you do when you connect—unless you have waiting messages (see LM below).

LL n (List Last)

This command uses the number (n) as a limit, and displays the last n messages. This is useful if you get disconnected before doing a List, since the BBS will assume you have read all the messages since your last connect.

example:
LL 25

LM (List Mine)

This command lists only messages addressed to you. (See RM below.)

L > callsign

This command lists only messages addressed to the specified callsign. This can be a regular call—like N1EVH or NJ1P—or it can be one of the group identifiers used to indicate special interest, like SALE or AMSAT.

examples:

L > NK1Q
L > YAESU

L < callsign

This command works just like L> but works for messages from the specified call.

example:
L < N1DDU

Note that the PBBS doesn't care about upper of lower case; the upper case examples are for clarity. It also helps to use a buffer—if your communications software supports one—so you only need to do the list once, then look at it in the buffer. The result of a list will look something like Figure 2.

Once you have a list of the messages, along with their message number (shown in the first column of Figure 2), you will be able to choose messages to read. The R (Read) command has two basic forms:

R message number

This command reads the message specified by the message number on the command line.

example:
R 2306

RM

This command reads all messages addressed to you. This can be used after—or even instead of—LM (see above). The PBBS will prompt you to Kill the messages after reading them. This saves disk space. If you want to leave them there for a while, it shouldn't be a problem. But it is a good idea not to accumulate too many messages on the PBBS—it doesn't please the sysop. The K (Kill) command works exactly like the R command—just substitute a K. You cannot kill messages that are not addressed to you. Figure 3 shows a typical R command in action.

The message starts with a header that provides information about when the message was posted, where it came from, and who it was intended for.

Well, this will get you started with PBBSs—next month we'll cover sending messages. Don't wait until then, though, if you want to try it—you can't break anything by experimenting. Keep those great cards and letters coming, I haven't had a chance to answer them all, but I read every one. 73 de N1EWO. RF

```
N1EWO de N5AAA: at 1642z on 920924 B,D,H,?,I,J,K,L,N,R,S,T,U,V,W
>
r 2304
Date: 19 Sep 92 17:46
Message-ID: 5766@KA6JLT>
From: K3QM@KA6JLT
To: ALL@ALLUS
Subject: Hawaii Inbound traffic
Path: N5AAA!N8GTC!W7JHX!KC7CG!KB7TV!KA6JLT
I spoke with a ham on Kauai a few days ago who recommended that people
with inbound health and welfare inquires call a FM radio station in Kauai
that was broadcasting these kinds of inquiries to the public. A neighbor of
ours tried the system and it worked for them.
73, Max, K3QM@KA6JLT.#NOCAL.CA.USA
N1EWO de N5AAA: at 1649z on 920924 B,D,H,?,I,J,K,L,N,R,S,T,U,V,W
>
```

Figure 3. A typical R command.

```
*** CONNECTED to N5AAA VIA WN9A [09/20/92 09:17:19]
[RLI-14.3-H$]
Hello Jeff, Welcome to the N5AAA Bulletin Board System
Servicing primarily MARION, HAMILTON and the surrounding counties.
Please leave a message if you have any questions, or need detailed help.
```

Figure 1. The N5AAA PBBS provides information about its intended service area.

```
N1EWO de N5AAA: at 1642z on 920920 B,D,H,?,I,J,K,L,N,R,S,T,U,V,W
>
ll 5
Msg#    Stat Size    To      From     @ BBS    Date/Time Subject
2306 B  2403 MODS    KJ6FY   ALLUS    0924/1628 MODS DATABASE DIRECTORY 1/9
2304 B  1044 ALL     K3QM    ALLUS    0924/1555 Hawaii Inbound traffic
2301 B  2317 RACES   W6WWW   ALLUS    0924/1544 RB.240  9/21/92 MGT—Worker's
2300 B  639 ALL      WA6SHM  ALLUS    0924/1544 Compiling List of 10-X Nets
2296 B  753 ALL      W2CRS   ALLUS    0924/1533 HP FILTER
N1EWO de N5AAA: at 1642z on 920920 B,D,H,?,I,J,K,L,N,R,S,T,U,V,W
>
```

Figure 2. Using the LL command to look at the last five messages.

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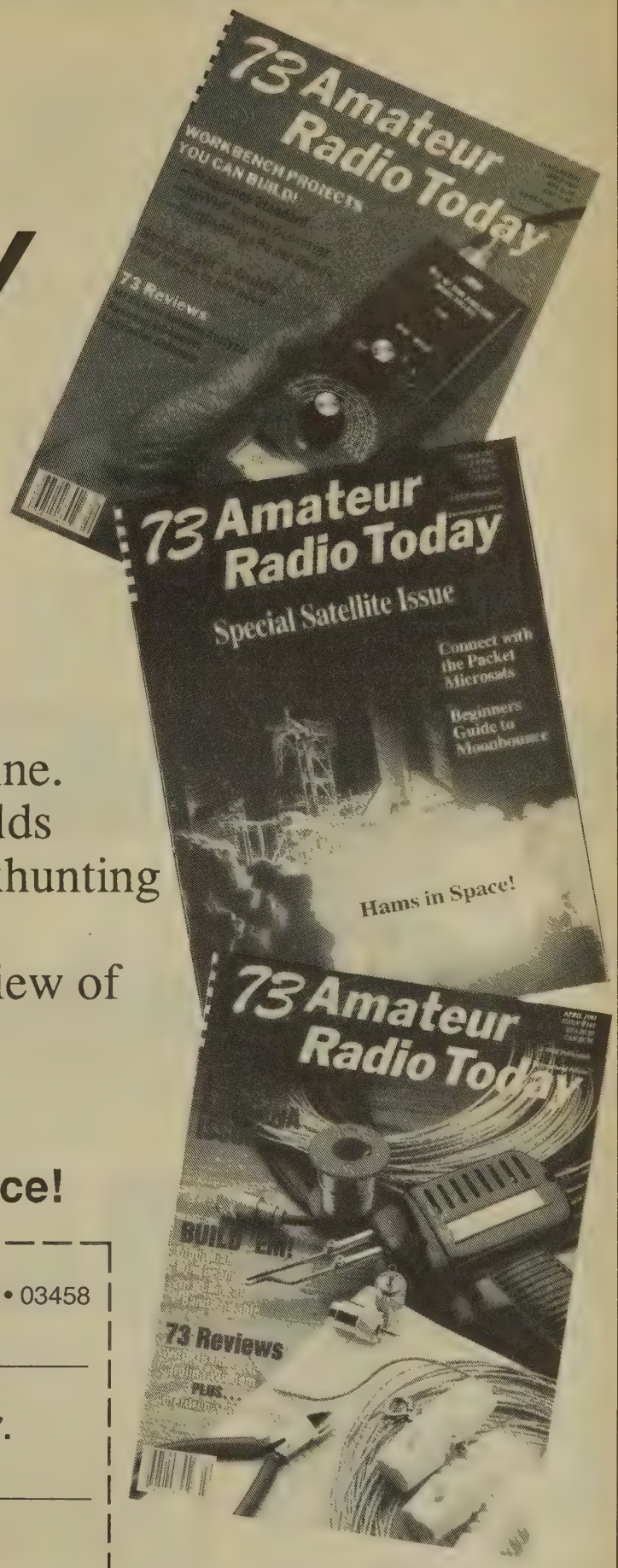

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ANNOUNCEMENT

McGREGOR, TX Amateur Radio License Exams are offered the 2nd Sat. of each month at The Community Center, 2nd and Madison, at 9 AM, for all levels. Fee $5.40. Walk-ins welcome. Contact ***Alma AB5BA, (817) 859-5374***, or ***Ed AB5CG, (817) 840-3807***.

NOV 1

LEBANON, IN The Boone & Clinton County ARCs will sponsor a Ham Fest at Boone County 4-H Fairgrounds Warm & Dry Community Bldg. from 8 AM-4 PM. Set-up at 7 AM. This location is 17 miles north of Indy, just off I-65 at exit 138. Free parking. Free Tailgating. VE Exams nearby. Flea Market. Dealers. Admission $3. Table and space $2. Talk-in on 147.105 and 443.150. For info call ***Don Jackman N9ILX, (317) 482-5211*** or ***Don Lecklitner N9GBO, (317) 654-6580***, or write to ***Boone County ARC, P.O. Box 186, Lebanon IN 46052***.

NOV 7

ENID, OK The Enid ARC will host a Ham Swap Meet at Garfield County Fairgrounds' Hoover Bldg., Oxford St. and N. 4th. Admission $1 at the door. Free tables. VE Exams at 10 AM, walk-in only. There will be technical programs throughout the day. Contact ***Fred Selfridge N5QJX, (405) 242-3551*** or ***Tom Worth N5LWT, (405) 233-8473***.

EUSTIS, FL The Lake ARA will hold their annual Hamfest/Electronics Expo at the Lake County Fairgrounds in Eustis FL, from 9 AM-5 PM. Tickets $4 in advance, $5 at the door. Tables still available @ $12.50 (includes 1 free admission). Large tailgate area, spaces $5 (does not include admission). VE Exams for all classes will start at 1 PM. Contact ***Cole A. Ruck KC4UIG, (407) 273-1624***.

MILWAUKEE, WI The Milwaukee Repeater Club will sponsor the 8th annual 6.91 Friendly Fest, rain or shine, from 8 AM-1 PM at Serb Halls 1 & 2, 51st & Oklahoma. All on the ground floor with easy access. Set-up at 7 AM. Advance tickets $3, $4 at the door. 4' Tables $4 in advance, $5 at the door. To save $1 per ticket or table, send SASE with payment to ***The Milwaukee Repeater Club, P.O. Box 2123, Milwaukee WI 53201*** before Oct. 31. VE Exams on site. Talk-in on 146.91- (The Friendly Rptr.) and on 146.52.

NOV 8

LONG ISLAND, NY The Radio Central ARC will hold their HAMEXPO at Suffolk Community College, Long Island Expwy. exit 62, Nicholls Rd./County Rd. 97 North 1 mile. All indoor Flea Market. Ham Dealers. Computer Show. Free parking. VE Exams. Admission $5 at the door. Tables $20 in advance. Send to ***Radio Central ARC, P.O. Box 680, Miller Place NY 11764***. Talk-in on 145.15-4Z or 449.525-2A. For info call ***John Mark KB2QQ, (516) 689-6336***, or ***Jo Ann Colletti N2IME, (516) 399-1877***.

NOV 14

MONTGOMERY, AL The Montgomery ARC will host the 15th annual Montgomery Hamfest in Garrett Coliseum at the South Alabama State Fairgrounds, located on Federal Dr. from 8 AM-3 PM. Free admission. Free parking. Flea Market set-up 3-8 PM Nov. 13th, and 6-8 AM Nov 14th. All indoors. No reservations required. FCC Exams on-site beginning at 8 AM---bring original and a copy of your current license, picture ID and $3.00. Talk-in on 146.24/.84 W4AP. Ragchew on 146.32/.92 (with phone patch, *up/#down), 147.78/.18, 449.50/444.50. Special Hamfest rates at Days Inn, I-85 Exit #3; desk phone ***(205) 269-9611***; or (across the street from the Hamfest), ***Coliseum Motel, (205) 265-0586 or 1-800-876-6835***. For info, write to ***Hamfest Committee, c/o 111 Diane Dr., Prattville AL 36066***, or phone ***Jiggs, (205) 365-0380***, or ***Fred, (205) 270-0909***.

NOV 14

PLYMOUTH, MA The Mayflower ARC will host a Flea Market at the Plymouth Memorial Hall Bldg. in Plymouth Center (RT3A) from 9 AM-3 PM. Admission is a $2 donation; children under 12 free. Tables $12 ea. in advance, $14 ea. at the door if available. Walk-in VE Exams. Talk-in on 446.625 and 146.55 simplex. To pay for tables, mail checks with an SASE to ***M.A.R.C., P.O. Box 766, Dept. FM, Plymouth MA 02361***. For exam info call ***Dave KA1TXO, (617) 585-1351***. For Flea Market info, call ***Jon WS1K, (508) 746-0162***, or ***Jim NM1F, (508) 747-2224 eves***.

NOV 14-15

FT. WAYNE, IN The 20th annual Fort Wayne Hamfest/Computer Expo/1992 ARRL Indiana State Convention will be sponsored by AC-ARTS, and held at the County War Memorial Coliseum. Doors open Sat. 9 AM-4 PM; Sun. 8 AM-3 PM. VE Exams both days. Coliseum parking $2 per car. Flea Market. Admission $5. Commercial tables $30. Flea Market tables $15, (electricity $25 extra). Reserve tables by Nov. 6th. Talk-in on 146.88- and 443.80+. Send SASE to AC-ARTS, P.O. Box 10342, Fort Wayne IN 46851. For general info call ***Don Gagnon, (219) 484-3317***. For table info call ***John Rufner, (219) 483-6305***.

NOV 15

BENSON, NC The Johnston ARS, Inc. will hold its annual "JARSFEST" at the American Legion Complex from 8 AM-4 PM. Tickets $4 in advance, $5 at the door. Tables $6. Tailgating $3. Set-up at 6:30 AM. Contact ***Bill Lambert AK4H, Rt 3 Box 315, Benson NC 27504. Tel. (919) 894-3352 between 7 PM-10 PM***.

BRANFORD, CT The Southcentral Conn. ARA will hold its 13th annual Flea Market at the Branford Intermediate School, at 185 Damascus Rd. Sellers 7 AM. Buyers 9 AM. Advance Tables $15, $20 at the door. Admission $4. VE Exams. Reservation deadline (in writing, no phone) Nov. 1. SASE to ***SCARA, P.O. Box 705, Branford CT 06405-9998***. For info call ***Brad, (203) 265-9983***. Talk-in on 146.01/.61.

MATTAPOISETT, MA An Amateur Radio Flea Market will be held at Knights of Columbus Hall. Admission $1. Table and space w/one admission $10. Set-up at 7:30-9 AM. Talk-in on 146.52 MHz. Please call or write if you have an interest in taking exams. Contact ***Kenneth Rapoza K1NSX, 19 Golf St., Fairhaven MA 02719. Tel. (508) 993-3993***.

NOV 21

PARK RAPIDS, MN The Smokey Hills ARC will hold a Ham Fest at the Eagles Club from 9:30 AM-3:30 PM. Tickets $3. $4 for a table and admission. Talk-in on 147.30. Contact ***Nick De Carlos, KA7VLH, Rt. 1 Box 352A, Park Rapids MN 56470***.

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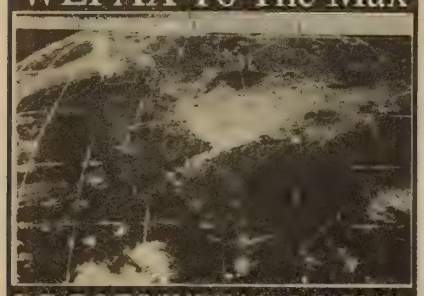

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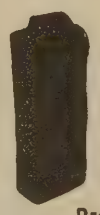

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NOV 22

MILFORD, CT VE Exams are scheduled for 12 noon at the Fowler Bldg., 145 Bridgeport Ave., by the Coastline Amateur ARA. Walk-ins. All classes. Contact *Gary NB1M, (203) 933-5125*, or *Dick WA1YQE, (203) 874-1014*.

WASHINGTON, PA The 5th annual Tri-State Hamfest/Computer Fair will be held at the Chartiers Houston High School from 8 AM-3 PM. This all indoor event is located 1.5 miles from Exit 8 off Interstate 79. Admission $3. Children under 12 free. Talk-in on 146.52 simplex. Directions on 145.49/144.89. Contact *Bob McCloskey, c/o WACOM, P.O. Box 1386, Washington PA 15301. Tel. (412) 695-8608 after 6 PM.*

WHEATON, IL G.M.R.S. of Illinois, Inc. will host their annual "Winter Fest 92," at DuPage County Fairgrounds, 2015 W. Manchester, from 8 AM-1 PM. Set-up at 6 AM. Tickets $4 in advance, $5 at the door. Tables $10 in advance, $12 at the door. Talk-in on 146.52 direct; 462.600, PL 173.8. Contact *G.M.R.S. of Illinois, Inc., 2077 W. Roosevelt Rd., Wheaton IL 60187*.

NOV 28

CULVER CITY, CA *JUN'S Electronics Store at 5563 Sepulveda Blvd.*, will be the site for the Toys for Tots Ham Radio Rally. This is the 2nd annual rally sponsored by Amateur Radio operators, to collect toys for underprivileged children in the Southland. To participate, bring a new, unwrapped toy, valued at $5 or more, between 10 AM and 4 PM. All toys will be collected for the US Marine Corps Reserves Toys for Tots program. A Special Event Station, KA6RJF, will be operating on 10 meters. Talk-in on 146.520 simplex.

DEC 5

FARIBAULT, MN The annual Courage Center Handi-Ham Winter Hamfest will be held at the Eagles Club, starting with registration at 8:30 AM. There will be a Handi-Ham equipment auction. Dinner at noon and program. Talk-in on 146.19/.79. Contact *Don Franz WØFIT, 1114 Frank Ave., Albert Lea MN 56007*.

DEC 6

HAZEL PARK, MI The Hazel Park ARC will hold their 27th annual Swap and Shop at Hazel Park High School, 23400 Hughes St. from 8 AM-2 PM. Tickets $3 in advance or at the door. Tables $12 (reservations for tables must be received with check, no phone reservations.) Free parking. Talk-in on 146.64-(DART). For reservations and info, write to *HPARC, Box 368, Hazel Park MI 48030*.

DEC 8

LARGO, MD To benefit Prince George's County RACES/ARES, Inc., HOLIDAYFEST 92 will be held from 8 AM-4 PM at Prince George's Community College Campus (exit 17A or 15A Capital Beltway). Donation $4. Tables $20. Symposium presentations, free VE Exams by Laurel VECs; please bring your original license/CSC or photocopy. Special CW speed challenge contest. Contact *HOLIDAYFEST 92, P.O. Box 1037, College Park MD 20740. Tel. (301) 572-2362*.

SPECIAL EVENT STATIONS

ANNOUNCEMENT

GERATOL NET Greetings Extra Radio Amateurs Tired of Operating Lately. The Geratol Net (for amateurs of all ages, from all states and the Canadian provinces) helps to assist U.S. Extra class amateurs and other operators (whose privileges allow them to use the Extra class portion of the 75 meter American phone band) to obtain the ARRL, 2-letter Extra Class SSB, WAS award. The number on the ARRL Certificate is known as the Geratol number. This net also aids those operators on the completion of the Canadian 2/80 Award offered by the Metro ARC. The Geratol net is not a DX net. For the purpose of this net, Canada is not considered DX. The Geratol net meets every night at 0100Z on or about 3.767 MHz, depending on QRM, and continues to operate until all hours, depending on band conditions and check-ins. For more info on the net, awards and endorsements, send a #10 SAE with 2 units of postage to *WØYTZ, 300 Valley View Dr., Ord NE 68862 USA*.

NOV 1

DELAWARE The members of the Warminster ARC will conduct their 4th annual DXPedition to the rare state of Delaware and will operate Station WA4DFU/3. Frequencies: 7.275, 14.275, 21.375 and 28.375 MHz. CW contacts will be made on request. QSL with SASE to *Warminster A.R.C., Box 113, Warminster PA 18974*.

NOV 5

CLINTON, NC The Sampson County ARS will operate Station AB4TT from 1700-2400Z for the Sampson County Expo and Pork Festival. Operation will be in the lower portion of the General bands. For a certificate, send QSL and SASE to *SCARS, P.O. Box 64, Clinton NC 28328*.

NOV 7

SANTA ROSA ISLAND, FL The Serious Hams ARC will operate Station N4MAD from Ft. Pickens State Park (IOTA 142) from 1200Z-0000Z on 80, 40, 20, 15, and 10 meters in the code and voice portions of the bands. Contacts made to Station N4MAD will receive a special QSL card. Sorry, no certificates this time.

NOV 7-8

HONOLULU, HI Hawaii Army MARS members will operate WH6R to commemorate the 50th anniversary of the rescue of Capt. Eddie Rickenbacker. Activities are planned for all bands, all modes, including the Novice subbands. Look for us at the lower portion of each subband, Nov. 7 1900Z-1900Z Nov. 8. For QSL please send your card and SASE to *Joe Mao, 3251 Pakahu St., Honolulu HI 96822*.

NOV 14

FT. PIERCE, FL The Ft. Pierce ARC will operate KN4RY from 1400Z-2100Z to commemorate the 7th anniversary of the UDT-SEAL Museum. Operation will be on the General portion of 40, 20, 15, and the Novice portion of the 10 meter band. For a certificate, please send a QSL and a large #10 SASE to *Fort Pierce ARC, P.O. Box 4, Ft. Pierce FL 34954*.

NOV 28-29

PLYMOUTH, MA The Whitman ARC will commemorate Thanksgiving by operating Station WA1NPO from 1400Z-2100Z each day. Frequencies: 3.970, 7.270, 14.270, 18.140, 21.370, 24.970 and 28.370. WA1NPO will operate from historic Plimoth Plantation, overlooking Cape Cod Bay. A special QSL card will be sent to those Hams and SWLs sending an SASE. A special 8 1/2 x 11 certificate with the Mayflower II in the background, is also available for this event. Send replies to *Whitman A.R.C, P.O. Box 48, Whitman MA 02382*.

DEC 5-6

GUANTANAMO BAY, CUBA The Guantanamo Bay ARC will operate Station KG4CA from the U.S. Naval Base at Guantanamo Bay, Cuba, from Dec. 5 0001Z-1700Z Dec. 6, to celebrate the 40th anniversary of Cuban-American Fraternity Day. Operation will be SSB and CW on 20, 15, and 10 meters. For QSL send QSL and SASE to *Guantanamo Bay ARC, PSC 1005 Box 73, FPO AE 09593-0146 USA*.

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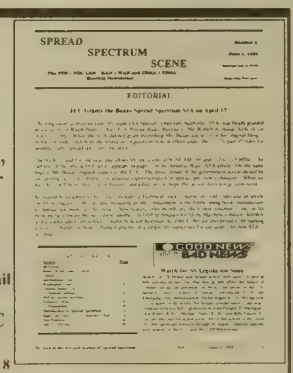
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CIRCLE 193 ON READER SERVICE CARD

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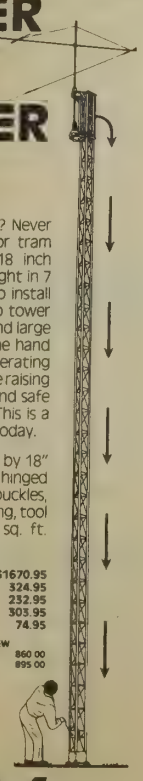

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CIRCLE 229 ON READER SERVICE CARD

Radio Fun flea market

Turn your old ham and computer gear into cash now. Sure, you can wait for a hamfest to try and dump it, but you know you'll get a far more realistic price if you have it out where 100,000 active ham potential buyers can see it, rather than the few hundred local hams who come by a flea market table. Check your attic, garage, cellar, and closet shelves and get cash for your ham and computer gear before it's too old to sell. You know you're not going to use it again, so why leave it for your widow to throw out? That stuff isn't getting any younger!

The *Radio Fun Flea Market* costs you peanuts (almost)-comes to 10 cents a word for individual (noncommercial) ads, and 70 cents a word for commercial ads. Don't plan on telling a long story. Use abbreviations, cram it in. But be honest. There are plenty of hams who love to fix things, so if it doesn't work, say so.

Make your list, count the words, including your call, address and phone number. Include a check or your credit card number and expiration. If you're placing a commercial ad, include an additional phone number, separate from your ad.

This is a monthly magazine, not a daily newspaper, so figure a couple of months before the action starts; then be prepared. If you get too many calls, you priced it too low. If you don't get many calls, too high.

So get busy. Blow the dust off, check everything out, make sure it still works right, and maybe you can help make a ham newcomer or retired old-timer happy with that rig you're not using.

Send your ads and payment to *Radio Fun Flea Market,* Judy Walker, 70 Route 202N, Peterborough NH 03458 and *get set for the phone calls.*

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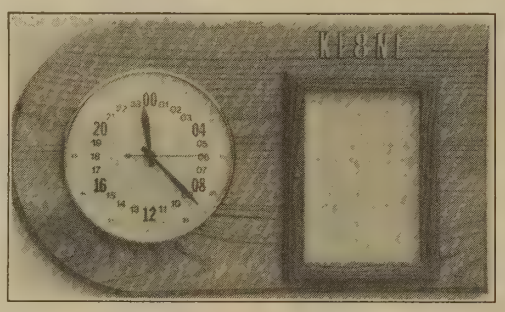
new products

MIDWEST WOOD PRODUCTS

Midwest Wood Products has introduced a new clock made of solid oak and measuring 10-3/4" by 19". It comes with a frame for either size U.S. license and has non-glare lenses for both the movement and display frames. The quartz movement is U.S.-made, runs on one AA battery, and is warranted by the manufacturer for six years. The wood and display frames are warranted for one year. The letters on the clock are self-adhesive and are easily changed if you upgrade or move and change your callsign—the necessary letters and numbers will be supplied for $1. The hardware is brass, including the bezel, and the clock is available with a natural finish or stained, and has a polyurethane finish.

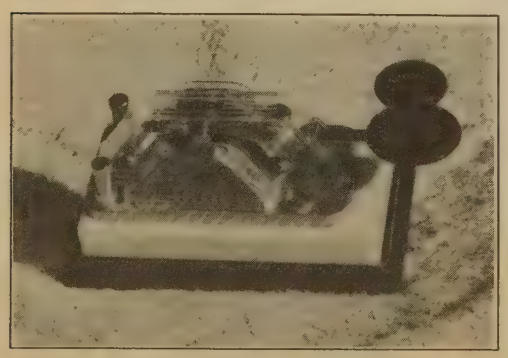
This clock is available in a 12-hour or 24-hour version for $69.95 plus shipping. For more information and/or a complete catalog, contact *Midwest Wood Products, 16141 24th Ave., Coopersville MI 49404; (616) 677-3706.* Or circle Reader Service No. 201.



MIKE ZBROZEK K8XF

Mike Zbrozek K8XF's telegraph keys import company is now distributing Hi-Mound Company (JA-land) telegraph keys for the U.S. market. K8XF recently visited Japan and was highly impressed by the white marble-based MK-705 iambic dual paddle and the HK-702 hand key. The smooth touch, excellent workmanship and solid feeling of the keyers far surpass what is usually found in the domestic market. K8XF is also handling the Bakelite-based BK-100 bug from Hi-Mound.

A limited stock is now on hand. All keys come with plastic dust covers. The MK-705 paddle is $129.95, the HK-702 hand key is $149.95, and the BK-100 bug is $154.95. Please add $8 S & H for the continental U.S.; FL residents add 6% sales tax. A flier is available (S.A.S.E. appreciated). Contact *Mike Zbrozek K8XF, 9929 Fox Squirrel Dr., New Port Richey FL 34654; (813) 862-6328.* Or circle Reader Service No. 202.



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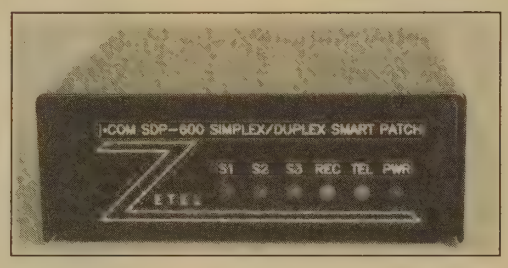
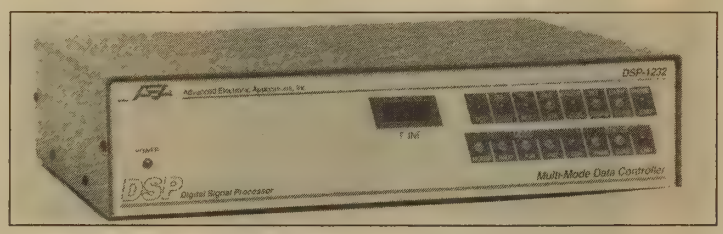


The Model SDP-600 autopatch from j•Com is a low cost microprocessor-controlled interface between a VHF/UHF transceiver and a telephone line, allowing the user to make and receive telephone calls from any HT or mobile rig within range of the base station. Installation consists of connecting the autopatch to the rig's microphone and speaker jacks and plugging in an RJ-11 telephone jack. Control and programming of the autopatch is done by DTMF tones issued from the remote. Separate user-programmable access password codes can be set up for local and long distance dialing. And, unlike other low cost autopatches, the SDP-600 can be used in full duplex mode with a dual-band transceiver, so both parties can hear each other at the same time. Simplex mode can also be used. With the reverse patch option enabled, incoming calls will cause a short ring-out over the air and the user can then answer the call using his access password code.

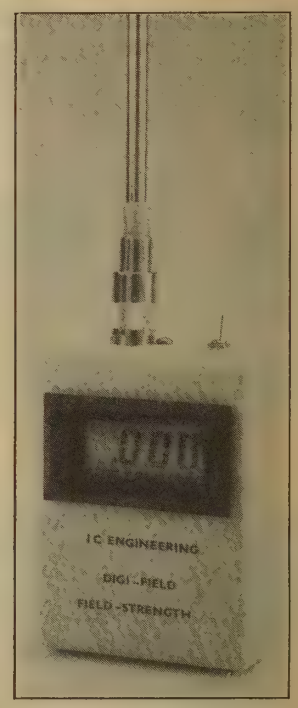
The SDP-600's introductory price is $199.95. Contact *j•Com, Box 194, Ben Lomond CA 95005; (408) 335-9120; Fax: (408) 335-9121.* Or circle Reader Service No. 205.

AEA



The DSP-1232 multimode data controller featuring digital signal processing is now available from AEA. A single-port version of the the DSP-2232, this controller features packet, AMTOR, Baudot, ASCII, Morse code, NAVTEX, WEFAX and more. It has all satellite digital modes, 9600 bps K9NG/G3RUH, 2400 bps, automatic identification of most types of digital signals, software DSP modems (future upgrades will be installed on EPROM chips) and software-switchable port selection. New modems can be uploaded into RAM from disk or telephone BBS. It also offers a complete 18K byte personal mailbox. This new controller eliminates the need for external modems for satellite work or high speed data.

The suggested list price is $799. For a product data sheet and a list of authorized dealers, contact *Advanced Electronic Applications, Inc., P.O. Box C2160, 2006 196th St. SW, Lynwood WA 98036; (206) 774-5554, (800) 432-8873.* Or circle Reader Service No. 204.



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Uncle Wayne's Bookshelf

BOOKS FOR BEGINNERS

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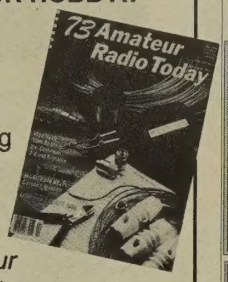

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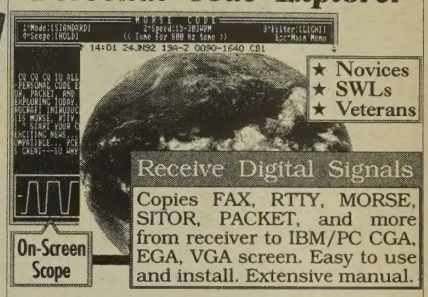
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RF1192

SAREX Flies Again on STS-47

The space shuttle *Endeavour* lifted off on September 12 at 14:22:59.974 UTC carrying two ham astronauts (Mission Specialist Dr. Jay Apt N5QWL and Payload Specialist Dr. Mamoru Mohri 7L2NJY) among its seven-member crew. This was the first on-time liftoff since 1985.

Due to the sleep and work schedule of the astronauts, most voice contacts took place over the Eastern hemisphere. Hams in the U.S. and Europe did have ample opportunity to work the shuttle via packet radio. The shuttle's packet callsign was W5RRR-1. This mission's high inclination orbit (57 degrees) put it within reach of those living in the higher latitudes.

Several schools in Australia and the U.S. were contacted directly by the shuttle and over 8,000 packet QSOs were recorded during the mission.

A QSL is available if you've worked the shuttle or if you have a reception report. If you made a packet contact with the shuttle, please include your QSO number. Send a SASE (foreign stations should include at least $0.50 postage or equivalent IRCs) to Jay Apt N5QWL at 806 Shorewood Drive, Seabrook TX 77586 USA.

Earthwinds Update

The Earthwinds around-the-world manned balloon flight is now scheduled to fly any time after November 15th. Inclement weather and wind patterns prevented last year's attempt from Akron, Ohio.

This time the launch point has been moved to Stead Field near Reno, Nevada. This area near Reno has some of the most favorable wintertime ground wind conditions in the U.S. and will give the launch team more opportunities for a successful liftoff of the complicated dual-balloon system.

The amateur radio experiment will operate during the mission under pilot Larry Newman's callsign KB7JGM. Twice each hour (at 30 and 55 minutes past each hour) a digitized voice message will give the balloon's latitude, longitude and ground speed on a frequency of 28.303 MHz. This should give anyone with modest receive capabilities the opportunity to track the balloon's progress as it flies non-stop around the world. The expected flight path should carry the balloon from Reno to Texas, the Midwest and the East Coast during the initial portion of its journey. Launch updates will be posted on the Balloon section of the *73 BBS* at (603) 924-9343.

QRP SSB Net

The QRP Amateur Radio Club International is sponsoring a new QRP SSB net. The Transcontinental CW/Sideband Net will be held each Saturday at 1900 UTC on 28.322 MHz in the Novice/Technician band segment. Alternatively, try 7.285 MHz in case 10 meters is closed by poor propagation. The Net Control Station will be KA9JKK, Max Adams in Indiana. *TNX Westlink Report, #634, September 25, 1992.*

Russian Hams Get U.S. Licenses—in Russia!

Actually two Russians, one Moldavian and three Ukrainians passed tests given by the ARRL VEC-coordinated Foundation for Amateur International Radio Service testing team. Twelve citizens of the Commonwealth of Independent States were tested by David Larsen KK4WW, John Douglas NØISL, and Victory Goncharsky KC1VF, who visited Russia and the Ukraine in May. Goncharsky, whose home call is UB5WE, obtained his American callsign while visiting the Dayton Hamvention two years ago.

While in the CIS, the visiting Americans not only worked as much ham radio as possible, but conducted workshops on instrument automation and local area networks. Exchange agreements were also worked out between universities in both regions. KK4WW also holds the callsigns UB5WUS and UA4LWW; wife Gaynell KD4GMV is also UB5WMV and UA4LMV; NØISL holds UB5WJD and UA4LIS; and Ron Angert N4AJT is assigned UB5W and UA4L. Along to videotape the three week visit to the CIS was (yet) unlicensed Jerry Scheeler, film producer for Virginia Polytechnic Institute and State University.

The successful test-takers and their new calls are: Helen RB5WA/KBØKNC, Igor UB5SDB/KD4QAW, Peter UB5DH/KD4QAV, Alex UO5ODC/KBØKNB, Valentine UA4LM/KBØKNA, and Serge UA4LQQ/KD4QAU. *TNX FAIRS and Westlink Report, #632, August 28, 1992.*

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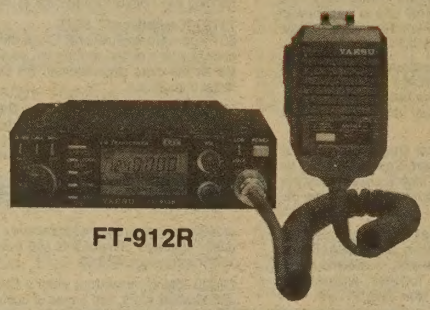
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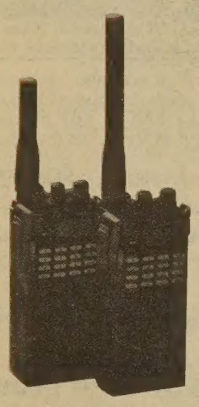
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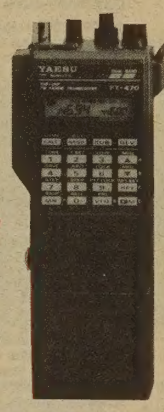
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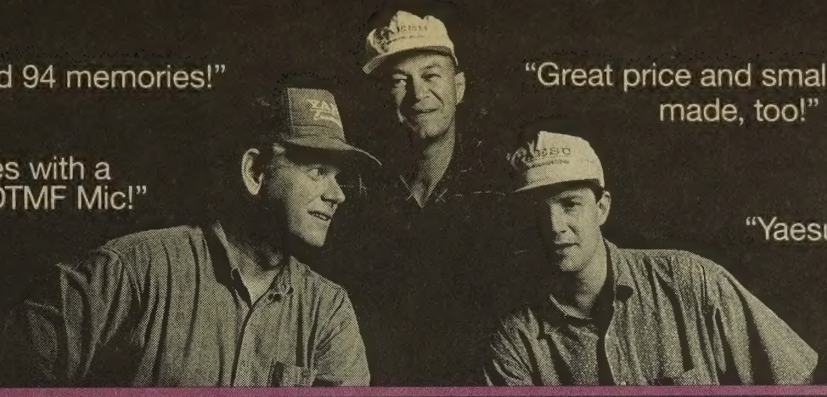


FT-5100
Dual Band Mobile

- **Frequency Coverage:**
  2M: 130-174 MHz RX
  140-150 MHz TX
  70 cm: 430-450 MHz RX/TX
- 94 Memories (47 per band) Odd Splits In Any Memory
- Dual in-band receive (V/V, U/U or V/U Receive Operation)
- DTMF Paging and Coded Squelch Included.
- Packet Radio TNC Jack Built-In To Back of Radio
- CTCSS Encode Built-In
- Dual Receive with Balance Control
- Full Duplex Cross Band Operation
- Built-In Antenna Duplexer
- Back Lit DTMF Microphone
- Automatic 8 Level Display Dimmer
- Built-In Cross Band Repeat
- RF Output Power:
  2M: 50/5 watt (high/low)
  70 cm: 35/5 watt (high/low)
- **Accessories:**

FTS-22	CTCSS Dual Decoder
SP-7	External Speaker
MW-1	Wireless Microphone/ Controller

The ultimate definition of Dual Band.

Now you can listen to two, 2 meter frequencies, or two, UHF frequencies, at the same time with In-Band Dual Receive*. Although equipped with traditional dual band, Yaesu has taken receive two steps beyond in the remarkable FT-5100. Combined in one compact mobile transceiver, it's the ultimate meaning of "dual band".

With 94 memory channels – more than any other radio in it's class – and the optional MW-1 Wireless Mic, the flexibility of the FT-5100 is matchless. But to make sure the FT-5100 is complete, and an even better value, unlike the competition, there's a backlit DTMF mic included.

Through advanced miniaturization technology you'll find practical additions like the built-in antenna duplexer – an option on similar transceivers – and equally important, DTMF paging and coded squelch. All in the smallest dual band made!

Priced for the shrewd buyer, you've got to hear it to believe it. Dual band re-defined. Combinations like this can't be found anyplace else, so contact your nearest Yaesu dealer and tell him you want the "ultimate dual band". The FT-5100.

*In-Band Dual Receive available only on FT-5100.

Three Dual Receive Configurations

VHF/UHF

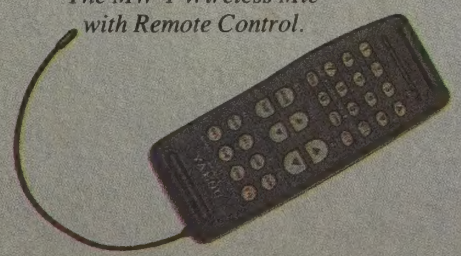
UHF/UHF

VHF/VHF

Dual band redefined.
And the choice is yours.

In-Band Dual Receive available only on FT-5100.

Here's another Yaesu exclusive!. The MW-1 Wireless Mic with Remote Control.



FT-5200. For those who don't want in-band dual receive, choose the security of the FT-5200 with it's quick-release front control panel (*not available on the FT-5100*). Comes with back-lit DTMF mic and built-in antenna duplexer.

YAESU

*Performance without compromise.*SM

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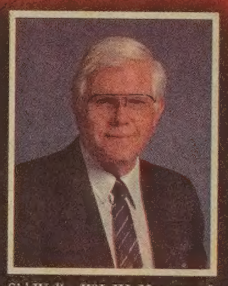
Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

3 GREAT REASONS TO BUY THE AZDEN PCS-7000H

1. Ultra Wide Band Reception
2. True FM Modulation
3. 50 Watts of Power

Now, for the first time, you can buy an Azden transceiver directly from the factory! This means that you will receive the level of knowledge and expertise that you want when buying a radio. It also means that you'll have competent technicians, ready to handle your service needs — quickly and efficiently!



Sid Wolin, K2LJH, Manager of Azden Communications Division

Transmit
- 144-148 MHz plus CAP and MARS (when modfied)
- 50 Watts/10 Watts-adjustable
- All 57 subaudible tones
- True FM modulation (great for packet)

Receive
- 118-135.995 MHz AM, 136-174.995 MHz FM
- Amateur, CAP, MARS, Weather, Marine, Public Service
- Sensitivity less than 0.19 µV for 12dB SINAD
- Patented discriminator center frequency tuning
- 2 Watts audio output

Other Features
- Frequency reverse
- 20 Memory channels in two banks
- One temporary memory channel
- Programmable frequency steps (5, 10, 15, 20KHz)
- Priority channel monitoring
- Lighted DTMF microphone
- Size: 2"H x 5-1/2"W x 7-1/2"D
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CIRCLE 92 ON READER SERVICE CARD